Brain-based English Activity Programs for Primary EFL Students: Comparing "Actional" and "Pictorial" Approaches to Teaching and Learning English Action Verbs

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ABSTRACT OF THESIS

With the announcement of the arrival of the "decade of the brain" in the 90s (Roberts, 2002), educators' attention has been gradually drawn to the educational implications of neurocognitive science. The present research represents an attempt to explore the potential of this new trend by drawing on and deriving educational insights from the neurocognitive science research findings of "actions" and "pictures".

Two studies were administered to two groups of Primary/Grade 3 EFL students (n= 28 & 30) recruited from local schools of Hong Kong Special Administrative Region. English activity programs teaching action verbs were designed, based on two main criteria: 1) "actions" and "pictures" as two types of teaching input, and 2) Caine and Caine's (1990) *brain-based learning principles*. The research objectives of the two studies were to examine the *linguistic* and the *affective* outcomes of learning in the "actional" and the "pictorial" teaching input model. In the second study, a third combined/ "actional-pictorial", "dual-input" teaching model was introduced to further explore if the two input modalities would have the same or different effects on the learners.

Quantitative and qualitative results from *both* the first and the second study consistently indicated that both the "actional" and the "pictorial" teaching input model would bring about **similar** growths of action verb knowledge and **similar** affective effects on the learners, owing to the similarity of the neurocognitive processing and the brain-based teaching-learning contexts of the two input models. However, the "combined" (or dual) teaching input model brought about the most remarkable positive change of affect in the learners. It was argued that the *variety* of the teaching input was essential to learners' feelings. Pedagogical implications for the TEFL profession were proposed accordingly.

論文摘要

自「腦神經年代」在九零年代宣世後，腦神經科學的教學含義逐漸引起了教育學者的注意。本項研究旨在探索這新趨勢；透過引用腦神經科學對於「動作」及「圖像」的研究成果，提出在教學上的新看法。

是次研究包括了兩項實驗；對象爲本地小學三年級的學生(人數分別爲二十八及三十)。實驗以教授「動作詞」的英語活動課程形式進行。其課程設計基於兩大規範：一)「動作」及「圖像」分別爲兩種教學的輸入；二)「以腦神經心智爲本的學習原則」(brain-based learning principles by Caine & Caine, 1990)。實驗的目標爲探究「動作化」及「圖像化」教學輸入模型在語言上及情感上的學習成效。在第二項實驗中，加入「動作」及「圖像」整合而成的「雙教學輸入」模型，以期更深入探討這兩種教學輸入模式會否對學員產生相同/ 相反的成效。

兩項實驗所得的量化及質化分析結果皆一致地顯示：由於「動作化」及「圖像化」的教學輸入模型所引發的腦神經活動和以腦神經心智爲本的學習原則之教學環境相類似，它們所帶來的動詞知識增長及正面情感影響亦十分相近。然而，「動作、圖像」雙教學輸入模型在正面情感影響方面有最顯著的成效。研究結果認爲「動作、圖像」雙教學輸入模型的「多樣化」有利於學員的情感；就此，本項研究亦對教英語爲外語的教育專業作出了相應的建議。

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Chapter 1

INTRODUCTION

This chapter begins with the question "Is (language) education in Hong Kong effective?", a question asked by many an educator, policy-maker and researcher in Hong Kong. It then takes a brief look at the English language education in Hong Kong in the past decade, and proceeds to look at some recent research projects in neurocognitive science for (language) education in U.S.A., Japan, Singapore, and Hong Kong, which provide the rationale for choosing the area of the research. Finally, the organizational structure of the thesis is outlined.

1.1 Background of the Present Research

1.1.1 Striving for the Best? English Language Education in Hong Kong

In Hong Kong, the public generally expresses a strong commitment to education and supports educational reforms, in the hope of a better societal development. English language education and research in Hong Kong over the past ten years have been centered on a number of issues related to English syllabus revision, benchmark qualifications for all language teachers, the medium of instruction, and so on. The education community has experienced several waves of reform as the successive education policies were proposed and implemented, in response to the perceived decline of the general standard of English (see, for example, Education Commission Reports, 1984-1997; Hong Kong SAR Government, October 1997; South China Morning Post, 12/12/1990 and 15/3/1998, cited in Lai, 2000).

Most Hong Kong students would respond positively when asked if they would like to be proficient in English; however not many of them would convert their wish into greater effort and satisfactory achievement in learning the language (Lai,

1997). This means that the original high hopes of the government in establishing the 9-year compulsory, free basic education, the good will of the public, and the wistful dream of the pupils have all failed, or, put another way, have not been fulfilled.

1.1.2 Projects in Neurocognitive Science for (Language) Education Research

The English language education in Hong Kong seems to have frustrated all the stakeholders. This leads to a pertinent question: What should be the next move in English education in Hong Kong? There is no easy answer. Nonetheless, one possible answer has been suggested by President Bush of the United States when he declared "the decade of the brain" in July of 1989 and underlined the importance of conducting brain research and knowing how the brain works for knowledge acquisition (Wolfe & Brandt, 1998). It is now generally accepted that what we have learned about our brain in the past 5 years is more than what we accumulated in the past 100 years. This has surely had an impact on every aspect of human life, including language education.

Planned Moves in Educational Research Overseas

In 2002, a number of governments overseas announced plans to bring the (language) research into the scientific (or neuro-cognitive science) domain[1] (cited by *Utilisation of Neuro-cognitive Science for the Improvement of Language Education*, 2004). In the United States, the State Department of Education announced a "*Cognition and Student Learning Research Grant Project*", and the National Science Foundation also announced awarding grants for "*Brain Research as a Foundation for Research on Learning*". In Japan, the Ministry of Education, Culture, Sports, Science and Technology recommended applying neuro-cognitive research findings to early childhood and adolescence education. In Singapore, the government announced that neuro-cognitive science would serve as the basic reference of educational design.

Applying Brain Research Findings to Language Education in Hong Kong

In Hong Kong, a project entitled *Utilisation of Neuro-cognitive Science for the Improvement of Language Education* (2004) was planned in 1999 and commenced in 2000, which was funded by The Quality Education Fund (QEF) of the Hong Kong SAR Government. One line of research adopted a hypothesis that incorporating both *nonlinguistic* and *linguistic* activities that share common brain area(s) in learning tasks conducted in a classroom would help develop the brain areas involved and would thus enhance their cognitive functions, one of which is linguistic learning (in their case, English language learning). This was inspired by a local brain research (Chan et al., 2000), which suggested that specific activation in the brain area improves the cognitive function it mediates.

The overseas and the local projects and grants mentioned above have signified and exemplified the first step of a future move in language education—the application of brain research to language teaching and learning. Such a move is a "big leap forward", but people would, before long, realize that the implications drawn from brain research and the *brain-based* principles formulated for (language) teaching and learning, in fact, support some long-standing educational practices (Roberts, 2002), and provide an alternative to the traditional frames of reference that help to reconceptualize teaching (Caine & Caine, 1990). No doubt, the brain is changing how we think of education, and education is, in turn, changing the brain, because the brain can rewire itself with each new stimulation, experience, and behavior coming through education (Jensen, 1998b). What is needed is for the language educators with conviction and enthusiasm to explore the potentials of applying neurocognitive research findings to (language) education. Though applied brain-based research is still

[1] See attachments in Appendix R1-4.

at its infancy, it appears to have great potential in informing everyday classroom practice and language instruction.

1.2 The Present Research

1.2.1 Significance of the Present Research

Up till now, other than the Project on *Utilisation of Neuro-cognitive Science for the Improvement of Language Education* (2004), there has been *no* research- or theory-based method for designing and delivering brain-based curriculum to teach a complete unit, course, or sequential program from a start to an end (Smilkstein, 2003). So, the present research could serve to partially fill the gap, by adopting a "one (dragon-)line" approach to conduct applied brain-based studies, that is, to start with neuroscientific research evidence, turn it into educationally relevant ideas or concepts, and to translate it into a brain-based curriculum or program, which is then implemented in a classroom setting — in short, from basic neuroscience research to classroom practice. The present research is among the first attempts to explore how language research as well as how brain-based language instruction could and would have influence on EFL learners' linguistic and affective domains.

In this research, two common teaching inputs in education (i.e., "actions" and "pictures") were reviewed from both the educational and the neurocognitive perspective. Since no educational or neurocognitive studies have been conducted in comparing the two types of input, the differences or similarities of the two inputs could not be appreciated. Therefore, the present research (which eventually evolved into two studies) set out to investigate the "actional" and the "pictorial" input in both language education and neurocognitive terms. Brain-based English Activity Programs for the acquisition of action verb, which targeted at Primary/ Grade 3 students, were

developed for such purpose.

1.2.2 Organization of this Thesis

This thesis reports the most essential information about the studies that took place in 2003 summer and 2004 spring, and comprises six chapters. First, in this chapter, the "why"/ motivation of the present research is spelt out—a response to the growing trend of using neuro-cognitive research findings for (language) education.

Chapter Two presents a literature review primarily concerning (1) the education and the neurocognitive findings of the "actional" and (2) "pictorial" inputs and some brain-related learning theories, which serve as the theoretical contexts for the design of the two studies. The research questions are also formulated.

Chapter Three reports the most essential information of the *first* study: the selection of subjects, the variables of the study, the development of teaching materials, the experimental teaching/ treatment, the design of the research instruments, and the analysis of test and questionnaire results. A discussion of the findings is also offered, and the inadequacies of the research design and implementation procedure of the first study are identified. A follow-up study, with ways of improvement, is suggested.

Chapter Four reports the revised methodology, together with the result analysis, of the second study. An evaluation of the second study is also presented towards the end of the chapter.

Chapter Five presents a discussion of the major findings of the second study, and compares them with the findings of the first study. The similarities and links between the two studies concerning the *linguistic* (knowledge of action verbs gained) and the *affective* (the attitudinal change) effects on the subjects are brought to light and discussed.

Finally, Chapter Six concludes the thesis with some advice and suggestions

for the teaching of English (action verbs) using different teaching input models in the FL classroom. A misconception of the use of the "actional" (or more active) teaching input model and the "pictorial" (or less active) teaching input model in teaching and learning English is pointed out. Recommendations for future research are offered.

Chapter 2

REVIEW OF LITERATURE

This review consists of three components drawing attention to, first, **education** findings of an "actional" input and a "visual" input, which are respectively related to the Total Physical Response (TPR) approach and the visual approach to language teaching and learning; second, the **neurocognitive** conception of language learning as a background knowledge to the brain research on the localization of the brain functions related to the "actional" and the "pictorial" (or "visual") input and the major brain-related learning theories; and third, the affective dimension of learning, reviewed through the socio-psychological and the neurological point of view. Last but not least, how the *education* and *neurocognitive* findings of the "actional" and "pictorial" input together with brain-based learning theory could be converged and applied to teaching and learning English seeking for an optimal teaching-learning environment will be addressed.

2.1 Education Findings of "Actional" and "Pictorial" Inputs

In this section, the Total Physical Response approach (Asher, 1966, 1969; Sano, 1986; Ray, 1990; Furuhata, 1999; Hadley, 2001) and the visual approach to language teaching and learning (Wittch & Schuller, 1962; Green, 1963; Byrne, 1977; Omaggio, 1979; Hudson, 1982; Cheek & Beeman, 1991; Wileman, 1993; Hanley et al., 1995; Chun & Plass, 1996; Vincent, 2001) will be reviewed, owing to their relevance to the "actional" and the "pictorial" input in teaching and learning.

2.1.1 Total Physical Response Approach

When it comes to teaching languages through *actions*, Total Physical Response (TPR) would be a representative teaching technique (or, an instructional strategy). TPR was

first proposed and developed to enhance *listening comprehension* in foreign language learning[1], since it was considered that "a more effective strategy may be to concentrate on only one skill" (Asher, 1969:16). The approach has taken a number of assumptions and premises. It was conceived that the process of learning a second or additional language is similar to the first language development, which allows the listening comprehension to be fully established prior to the oral production (Thatcher, 2000; Hadley, 2001). The approach is also based on the belief that skills can be more rapidly assimilated if the students' kinesthetic-sensory system is appealed to. Consequently, Asher (1969) designed that the learners utilized physical motor activity (i.e., "actions") to show their understanding, which would be suitable for the language classroom of students, who tend to be quiet and reluctant to speak, especially in a beginners' level class (Furuhata, 1999). The learners would listen to a command in the target language and immediately obey with a physical action through miming the instructor who gave as well as acted out the command. Essentially, TPR directs teaching of a foreign (FL)/ second language (L2) to the coordination of verbal commands and actions, which guides the learners towards the understanding of the FL/ L2.

There were a series of experiments to investigate the effects of TPR (Asher, 1969), in which a number of factors were taken into account (e.g., the condition of applying the TPR technique, the complexity of the target utterances, time, and age, etc.). The subjects were American undergraduates aged between eighteen to twenty-one, while there was one group of elementary school children. The general findings gathered from the research are that, first, the application of the TPR in retention tests appeared to produce a "dramatic facilitation" in learning listening

[1] Originally, TPR applied to foreign language learning (Asher, 1966), but it was extended to second

comprehension for a second language (no matter if the subjects were acting out or observing the action done by the instructor in the training session). Next, the motor act could generate such dramatic facilitation to learning only when the complexity of the learning task (i.e., the foreign utterances) was increased. Third, the learning effect was a lasting one. Fourth, results indicated that the biggest impediment to the listening comprehension was applying a translation method in either/ both training and retention tests; fifth, learning both listening and speaking together led to a decreased comprehension of the target language. Finally, adults were far superior to children in the second, fourth, and eighth grades in listening comprehension of the foreign language when all the subjects learned through TPR. To add to the above, it was reported by Asher (1966) that the accelerated learning effect held for both Japanese and Russian language. There were other studies that confirmed the positive effects and perceptions of the TPR strategy. For example, Sano's (1986) study showed the effectiveness of TPR in the language classroom and a positive disposition to this approach among the Japanese subjects. Furuhata's (1999) study also suggested that the Japanese students generally preferred innovative methods, such as the command usage in English (TPR). In terms of learning style preferences, Furuhata revealed that Japanese students favored the *kinesthetic* learning style most, and auditory learning style second, which was in line with the finding of Reid's (1987) study. So, TPR presents a way of teaching preferred by the *kinesthetic* students, who enjoy a lot of movements, as described by Gardner (1983) and Reid (1987; 1995).

Although there were some criticisms against the TPR approach concerning, for example, the TPR strategy approximating the mechanisms of child's L1 acquisition in adult L2 learning (Thatcher, 2000) and the limitations of the strategy

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language learning as well (see Thatcher, 2000).

on what proficiency goals can be effectively achieved, in the present decade, the approach was extended and specialized with the use of stories as Total Physical Response Storytelling (TPRS) to teach vocabulary by Ray (1990), who drew on how well interactive movements and stories helped his students learn Spanish and French in schools. Storytelling works as an essential vehicle for utilizing and expanding the acquired vocabulary by contextualizing it in interesting stories, which students can hear, see, act out, and retell. Thus, the language learnt in the narrative and descriptive modes through TPRS could be useful for meaningful communication.

2.1.2 Visual Approach

When it comes to teaching languages through *pictures*, the visual approach to teaching and learning should receive the center of attention. Students nowadays are accustomed to a diverse array of modern communications, including television, movies, comics, magazines, and computers connected to the Internet, which are central to their lives and key ways to receive information. It has been remarked a long time ago that the teachers, who witnessed the inadequacies of too great reliance on traditional face-to-face verbal instruction, were on a verge of change (Wittch & Schuller, 1962). Since then, the use of visuals has been well known for its potential in language teaching. It saw its heyday and blossomed in the sixties, when there were some excellent audio-visual courses (Byrne, 1977). In these courses, the dialogue was the main instrument of presentation and was accompanied by the visual component usually in the form of a *picture* strip. And, the audio-visual education has, since the sixties, continued to develop through the medium of the filmstrip, the motion picture, etc., and through the teacher's opportunity to handle creative activities in these media. And it is well established now that "visual images increase learning retention, which is one of the primary goals of educators," and visual message can be effective and

efficient (Wileman, 1993: 5; Cheek & Beeman, 1991).

The reasons for pursuing the visual approach to teaching are obvious from how students learn, and could be concluded from a number of studies. Perception is the basis of understanding, which makes learning happen (instead of remembering)—perception is the first step towards understanding (Green, 1963; Wittch & Schuller, 1962). "Seeing is believing": visual approach has proved itself valuable to children's learning. The adult minds are more mature, more highly trained, and possess a richer basis of knowledge and experience for interpreting new knowledge or solving a problem; for the children, however, there might be a big gap in the same process. Visual materials can help to solve this by offering assistance in many ways in dealing with the transition from the unknown to the known. Wittch and Schuller (1962) stated that younger children learn best from pictures that are not complicated.

Omaggio (1979) conducted a study of reading comprehension in French as a foreign language, using a variety of visual contexts as advanced organizers. Results of the study revealed that students who had *still* images describing action from the story had significantly fewer comprehension errors and a significantly higher number of facts and inferences recalled from the text than those who received only written text. Hudson (1982), in a similar study with students of English as a second language at lower level of proficiency, also found that the providing pictorial cues greatly aided the comprehension of reading passages as compared to offering a list of vocabulary items with definitions, or to having the students through the procedures of reading a passage, taking a multiple-choice test, re-reading the passage, then taking the test again.

More recently, due to the advancement in technology, the effectiveness of *dynamic* visuals has also been studied. Hanley et al.'s (1995) study with children in

second language reading comprehension showed that dynamic visual (i.e., video) was more effective in aiding comprehension and retention than the static one. In Chun and Plass's (1996) study which investigated multimedia learning, it was found that a dynamic visual advance organizer aided in overall comprehension, and annotations of individual vocabulary items consisting of *both* visual and verbal information helped more than verbal information only, which underlined the importance of visual information in addition to verbal information. Lastly, Vincent (2001: 242) suggested that "a significant sample of children in any class may be categorized as having a preferred visual learning style", and the problems of these children who were situated in an education system that relied largely on the verbal means of delivery were identified (e.g., Sinatra, 1986; Olson, 1992, cited in Vincent, 2001: 242). And, Sinatra proposed changes to the curriculum to suit the need of the *visual* students, i.e., those who enjoy reading and obtaining information by visual stimulation, as described by Gardner (1983) and Reid (1995).

To have a quick grasp of what a "visual aid" is, Cheek and Beeman (1991) provided a definition useful in measuring the effectiveness of the visual aid, which is anything the student / audience can see that is used by the teacher to get his or her message across. There is a wide range of visuals that can be used in the classroom. In terms of *symbols* (the representation of one object by another object), objects, actions, or processes can be represented by pictorial symbols, graphic symbols, or verbal symbols. Pictorial symbols are photographs, illustrations, or drawings; graphic symbols are categorized into the image-related, concept-related, and the arbitrary graphics; verbal symbols are linguistic units, such as words, sentences, and so on. The human body (in terms of gesture, facial expressions, and body movements) is one very common type of visual aids (Cheek & Beeman, 1991). *Static* materials have been

used in education for a long time and they are preferably used for individual work or for group work with small numbers of pupils (Green, 1963), while there has been a growing interest in the dynamic visuals, as could be seen from the more recent studies. The presence and absence as well as the choice of the visuals are directly related to a consideration of the learner's ability and interests (Wileman, 1993).

2.2 Neuro-cognitive Findings of "Actional" and "Pictorial" Inputs and Learning

In this section, the neurological facts of learning will first be reviewed so as to provide some background knowledge for the review of the cognitive processes and the brain areas activated by the "actional" and the "pictorial" input. Following would be a brief introduction of the brain-related learning theories, which reflects the growing research in *neurocognitive science* as a stunning power and direction for future (language) education.

Over the years, discussion of language learning based on neurocognitive studies was largely related to the lateralization of the brain. Our linguistic ability was established to be largely the preserve of the left hemisphere of the brain. Often, those studies have taken *aphasic* patients as subjects. Binkofski et al. (2000) comments that since the seminal case description by Broca (1861), the damage to the left inferior frontal cortex has been well known to disrupt language production (Mesulam, 1990; Liberman, 1996). Broca's aphasic patients produce agrammatical speech, which is not fluent and oddly inflected, but they have good comprehension.

Yet, thanks to the advent of the brain research using more recent, up-to-date neuroimaging technology (e.g., Positron Emission Tomography[2] (PET),

[2] PET, using radioiostopes, measures brain activity by monitoring changes in oxgen utilization, glucose utilization, and cerebral blood flow changes. Both techniques require subjects to stay motionless

functional Magnetic Resonance Imaging[3] (fMRI), etc.) and neurologically *healthy* subjects, the localization of the brain regions has been presented in a new light. The posterior part of the inferior frontal cortex was considered to be involved in visual and auditory language comprehension and syntactic as well as phonological processing (Friederici et al., 1997; Chee et al., 1999, etc., cited in Binkofski et al., 2000: 273). Certain cognitive tasks that can selectively activate specific parts of the brain have also been identified (Roland, 1997). So, we will review studies and investigations on human cognition in association with "actions" and "pictures", and summarize the brain areas involved (see also Appendices A1 & A2). But, we will now learn some brain basics of (language) learning.

2.2.1 How Does the Brain Learn (Language)

Brain researchers/ scientists are very careful not to offer overly confident "prescriptions" for using their research in schools, but to caution educators to resist the temptations to formulate policies on the basis of a *single* study (Wolfe & Brandt, 1998); hence, the understanding of the brain's functions would be essential to avoid the pitfalls of pseudoscientific fads and drawing inappropriate generalizations for teaching and learning. The human brain will be seen through a set of functional structures. Furthermore, how the brain learns (language) will be briefly explicated through the principles of brain organization and neural information processing.

2.2.1.1 Functional Organization of the Brain

The brain is viewed as a set of structures situated on top of the spinal cord. The brain functions are localized in different parts of the brain, meaning that different parts of the brain execute different information processing tasks (*Understanding the Brain:*

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during imaging.

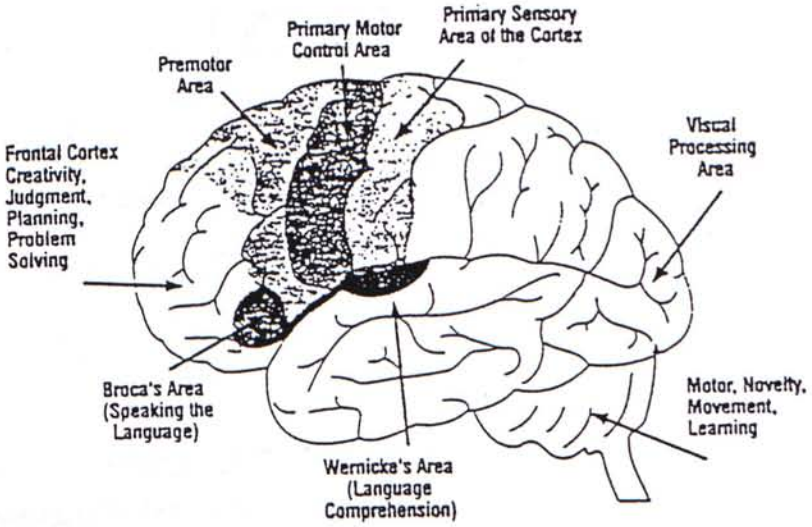
[3] FMRI, with the use of radio frequencies and magnets, captures changes in the concentration of deoxygenated haemoglobin.

Towards a New Learning Science, 2002). The lower structures engage in co-ordinating basic bodily functions (e.g., breathing, digestion, voluntary movement), while the higher structures, which reside in the neocortex or cerebral cortex (a thin sheet of neurons that coats the "convoluted" surface of the brain), is where thinking is done and three-fourth of the neurons gather. The human brain has the largest "uncommitted" cortex than that of any species on earth, having no specific function identified (Howard, 1994) and constituting an extraordinary flexibility and "space" for learning.

The brain consists of two cerebral hemispheres, the left and the right, which are linked by bundles of nerve fibers, called corpus callosum (Jensen, 1998b). Although each side of the brain processes things differently, some earlier descriptions and assumptions about the brain are now known to be erroneous. In general, the left hemisphere processes logical sequencing, reasoned judgements, language-related ideas and so on, while the right hemisphere processes visual patterns and images, spatial information, and spontaneous, random, and open-ended ideas, etc (Politano & Paquin, 2000). It should be noted that the old biases about music and arts are "right-brained frills" are outdated (Jensen, 1998b). Each hemisphere is divided into four areas called lobes, which are specialized for different tasks: The **frontal lobe** (front of the brain) deals with planning and action. The **temporal lobe** (side of the brain, around the ears) is concerned with audition, memory, and object recognition. The **parietal lobe** (top of the brain, toward the back) controls sensation and spatial processing. The **occipital lobe** (back of the brain) is responsible for vision (*Understanding the Brain: Towards a New Learning Science*, 2002: 45). "Each lobe is further subdivided into interlocking networks of neurons specialized for very specific information processing". Indeed, like the parable of the brain as a *jungle* offered by

Edelman (1972 recipient of Nobel Prize for Physiology), the brain operates on systems that interact continuously in an apparently chaotic-like fashion.

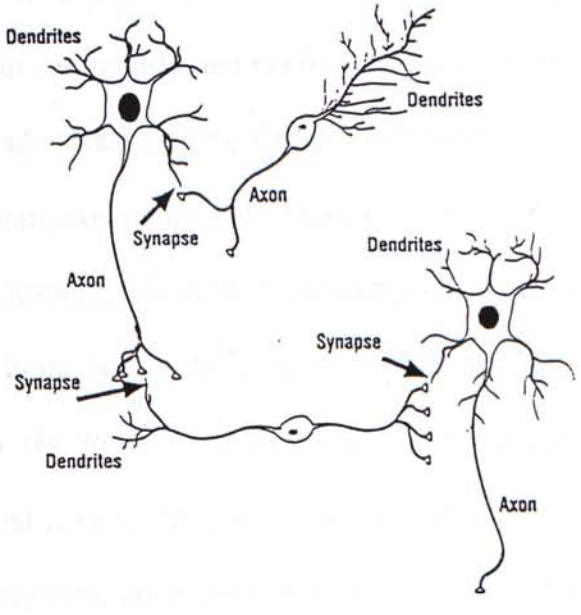
Fig 2.1 Diagram of a Brain with Both Hemispheres



2.2.1.2 Brain's Fundamentals of Learning (Language)

The basic unit of the brain is the *neuron*. Each neuron has one *axon* that grows *dendrites* (which are "tree-like" fibers) at the tip (*Understanding the Brain: Towards a New Learning Science*, 2002). The basis of information processing are the connections of neurons (i.e., synapses) in the networks, through which information signals as electrical impulses flow massively in many directions at one time. A huge number of neurons are activated simultaneously and create a so-called "pattern of activity" that corresponds to a particular mental state. Yet, this alone is not sufficient to yield learning. Fig 2.2 below shows a picture of two neurons in connection:

Fig 2.2 Diagram of Two "Connected" Neurons



Note. This diagram is freely adapted from Jensen's (1998b) *Teaching with the Brain in Mind*, p12.

For learning to take place, a kind of stimulus to the brain first starts the process (Jensen, 1998b). The stimulus could be internal (like a brainstorm) or external (like a new experience). The stimulus is, next, identified and processed at several levels. A cell is electrically stimulated over and over again so that it excites a nearby cell. Finally, there is a formation of the memory potential. A weaker stimulus is required to be applied to the nearby cell a short while after, since the nearby cell's ability to get activated is improved. As a consequence, learning has taken place when a brain cell requires less input from another cell the next time it is activated, or, conversely, when the neural connections are strengthened. "Knowledge" is defined as whatever triggers cognitive flow from one mental state to another, which must be encoded in the neural connections (or, synapses), and "learning" refers to the growth of new synapses (*Understanding the Brain: Towards a New Learning Science*, 2002) or the connecting of dendrites (Smilkstein, 2003).

It has been suggested that learning will spontaneously occur on the

condition that the brain is not restricted from fulfilling its normal processes. "What the human brain does best is learn" (Jensen, 1998b: 12). Learning brings changes to the brain, since the brain can modify and rewire itself structurally, depending on the type and amount of usage (Healy, 1990; Green, Greenough, & Schlumpf, 1983) as well as on new stimulation, experience and behavior (Jensen, 1998b).

In language learning, likewise, "[language], in general, is not processed by a single region of the brain but by different neural systems located throughout the brain" (*Understanding the Brain: Towards a New Learning Science*, 2002: 51). Neville pointed out that *second language learning* comprises comprehension and production, within which there are a number of processes (*Understanding the Brain: Towards a New Learning Science*, 2002). Two main processes[4] are grammar processing and semantic processing, which are mediated by different neural systems within the brain. Grammar processing, for example, recruits more frontal regions of the left hemisphere, whereas semantic processing (e.g., vocabulary learning) activates the posterior lateral areas of both the left and right hemisphere.

2.2.2 Localization of Brain Functions of "Actions"

Action, according to Grèzes & Decety (2001:1), is "the means by which the self interacts or reacts with the external world", and can be considered as the "final expression of several information processing stages: intention, programming, preparation, and execution". Goal-directed actions are considered internally generated, and therefore involve *motor representation*. Different from the education and ordinary concept of "action", it was indicated that action involves a number of cognitive states: **action execution** (e.g., grasping an object), **mental simulation of action** (e.g., imagining grasping a visually presented object), **observation of action**

[4] Language involves other processes, referred to by Dr. Neville, among which understanding context

(e.g., watching a grasping movement), and **verbalization of action** (e.g., explicit/ silent generation of a verb associated with movement of grasping an object) (Grèzes & Decety, 2001).

The activation of brain areas triggered by these aforesaid facets of action and, in addition, by learning actions will be described. First of all, *execution of action* (i.e., movement execution) appears to be mediated by primary motor cortex, premotor cortex, supplementary motor area, cingulate gyrus, cerebellum, and inferior and superior parietal lobes (Grafton et al., 1996; Matsumura et al., 1996; Binkofski et al., 1999; Stephan et al., 1995; Jenkins et al., 1994; Sadato et al., 1996; Catalan et al., 1998; Krams et al., 1998).

Mental simulation of action refers to the "mental rehearsal of a motor act without performing any overt movement" (Grèzes & Decety, 2001:2). It was revealed that both explicit motor imagery (Decety et al., 1994; Stephan et al., 1995; Frith et al. 1996; Grafton et al., 1996) and implicit motor imagery (Parsons & Fox, 1998) activates the dorsolateral prefrontal cortex, precentral gyrus, SMA, inferior parietal lobe, cingulate gyrus, subcortical nuclei, and cerebellum. There are also a number of brain areas found to be involved, and they are namely primary motor cortex, premotor cortex (Grèzes & Decety, 2001), and the Broca's area, the left inferior frontal (Binkofski et al., 2000). Ruby and Decety (2001) investigated simulation of actions with a first-person or third-person perspective and discovered that both conditions involved common activation in the SMA, the precentral gyrus, the precuneus and the MT/V5 complex. In addition, right inferior parietal, precuneus, posterior cingulate and frontopolar cortex were recruited by the third-person perspective, when compared to the first-person perspective, while the opposite contrast showed activation in left

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and intent, prosody, and phonology (see the New York report on the OECD website, *op. cit.*)

inferior parietal and somatosensory cortex.

Next, concerning o*bservation of action* (Bonda et al., 1996; Grafton et al., 1996; Decety et al., 1997; Grèzes et al., 1998), during the perception of goal-directed hand action, brain activations were detected in premotor cortex, middle temporal gyrus, inferior and middle frontal gyri, and parietal cortex in the left hemisphere. And, for the perception of motion and imitation afterwards, brain activations were detected in the occipito-parietal pathway extending to the premotor areas in both hemispheres, and rCBF increases were also found in the SMA, cingulated gyrus, and middle frontal gyrus (Decety, 1996; Passingham, 1996).

Verbalization of action, during silent naming of tools or to the generation of tools or to an object, based on *visual* stimuli (Martin et al., 1995, 1996; Grafton et al., 1997; Perani et al., 1999; Grabowski et al., 1998) or on *auditory* stimuli (Warbuton et al., 1996), is consistently found to involve brain activation in the inferior frontal gyrus, corresponding to Broca's areas and in the middle and inferior temporal gyri. In addition, activations are found in the ventral premotor cortex and sometimes in the parietal lobule (Martin et al., 1995, 1996; Grafton et al., 1997; Grabowski et al., 1998).

Apart from the action's four cognitive states, *motor learning* is defined as the process of improving motor performance by executing movements, identifying errors, and correcting those errors in subsequent movements. du Lac (1999) summarizing from a number of studies on motor learning suggested the involvement of the brain areas including cerebellum, basal ganglia, primary motor cortex, somoatesensory cortex, prefrontal cortex, and the supplementary motor areas. Catalan et al. (1998) also found that sequential finger tapping (which requires motor learning) involves ipsilateral premotor area (Brodmann area 6), bilateral posterior parietal areas

(Brodmann area 7) and precuneus in relation to the length of the sequence.

After conducting an extensive review and analysis (a meta-analysis) of the literature related to the four cognitive states entailed by action, Grèzes and Decety (2001) proposed the concept of "*shared motor representation*", drawing on a similar concept proposed in developmental psychology (Meltzoff & Moore, 1997) in terms of shared representation in perception and production of human acts. And based on works such as Rizzolatti et al. (1996), who observed that neurons in Broca's area in the left frontal cortex appeared to respond both to the production of visually guided actions and to the visual perception, Grèzes and Decety (2001) evaluated the structural level of the different cognitive states of action, which are believed to constraint the functional level. They further proposed the notion of "*functional equivalence*" between representations involved in action execution, mental simulation of action, observation of action, and verbalization of action, because they are supposed to bear relationship to potential action.

Grèzes and Decety (2001: 8) discovered that "there are common activation sites in favor of a functional equivalence between action execution, simulation, and observation across studies", which were the SMA, the dorsal premotor cortex, the supramarginal gyrus, and the superior parietal lobe. This could be accounted with regard to their roles for generating a motor plan appropriate to an intended goal, while mental simulation was in addition found to be associated with the ventral premotor cortex, which may be explained by verbal mediation, and observation of action is associated with additional activation in the temporal pathway, which is consistent with processing of the visual scene. Both mental simulation and observation of action with the intention to act was discovered to engage the pre-SMA and the dorsolateral frontal gyrus, because of their association with prospective memory for planned action.

2.2.3 Localization of Brain Functions of "Pictures"

"Humans have a remarkable ability to remember pictures" (Grady, 1998: 2703). Concerning pictures, there are several encoding conditions of pictures, in which association encoding, novel picture encoding, and episodic encoding of pictures (semantic encoding and intentional encoding) will be targeted in this review section. Encoding is considered equivalent to consolidation (Montaldi et al., 1998) or acquisition (Nyberg et al., 2001); picture encoding in the concerned conditions, in general, refers to studying and knowing what the picture looks like.

According to Montaldi et al. (1998), *associative encoding* of pictures entails the experimental conditions which required the subjects to focus on what a picture was generally about by paying attention to its main features, memorized the features of the pictures, and recognized how these features related to each other within the picture (i.e., both the functional and positional relationship). The pictures used were *novel complex scenes* taken from *National Geographic* (pre-1990 editions). Associative encoding of pictures was found to significantly activate brain areas including the left hippocampal/ parahippocampal region, the left cingulate cortex, the right prefrontal cortex, and the medial temporal lobe. Activation was also found in the right cingulate cortex.

During *novel picture encoding* (i.e., viewing *novel complex colored magazine pictures* carefully for later recognition), brain activations were detected bilaterally in posterior hippocampal formation, parahippocampal gyrus, fusiform and lingual gyri (Stern et al., 1996). Stern suggested that "the encoding of novel, complex pictures depends upon an interaction between ventral cortical regions, specialized for object vision, and the hippocampal formation and parahippocampal gyrus, specialized for long-term memory" (p.# 8660).

In Grady et al.'s 1998 study, *episodic encoding of pictures* was studied under three conditions (i.e., distinguishing encoding of pictures from that of words, characterizing semantic encoding from non-semantic processing and intentional learning, and dissociating intentional learning from the other two conditions). *Line drawings* of familiar objects were the stimuli for picture encoding conditions. To summarize the results from the three experimental conditions, greater activation was found during *encoding of pictures* than that of words in bilateral ventral and dorsal extrastriate cortex (see also Zeki et al., 1991), and in bilateral medial temporal cortex, particularly in the ventral portion; *semantic encoding of pictures* resulted in an increased activity in brain regions in the left hemisphere, which included ventral and dorsal portions of medial prefrontal cortex, an area that included both the medial temporal region and the posterior portion of the insula, and, in addition, bilateral posterior extrastriate cortex; *intentional learning of pictures* activated the left ventrolateral prefrontal cortex, and, in addition, the left premotor cortex, caudate nucleus, and bilateral ventral extrastriate cortex. Concerning different encoding strategies (i.e., semantic processing and intentional encoding) in the experiment, it was observed that although both strategies involved some elaborative processing that engaged left prefrontal cortex, there was a dissociation between the parts of left prefrontal cortex that were involved in the two strategies. It was concluded that the memory for pictures is superior to words, particularly in situations that provide less than adequate support for later retrieval.

Summary

The essential neural activates involved in "actions" and "pictures" has been reviewed and the brain mapping of specific cognitive functions is summarized in Appendices A2 & A3. Pedagogically, "actions" and "pictures" are different types of input (c.f.

Section 2.1.1 & 2.1.2); likewise, neurocognitively, the two types of input activate largely different cognitive processes and corresponding brain areas. Only that there is some overlap in the gross activated brain structures or areas (as highlighted in Appendices A2 & A3), but it seems there is not much exact overlap in the subdivision of the brain areas, and the overlap appears to be related to the *visual* stimuli involved in "actions" (concerning, for example, observation and simulation of actions) and "pictures".

2.2.4 Brain-related Theories of Learning

After recognizing some basic knowledge about the brain structures, the brain's mechanisms in learning, and the localization of specific brain functions, we will move on to the learning theories founded on the "brain facts". The twentieth century learning theories will, nevertheless, serve as the background, acknowledging the fact that influences on the development of learning theories come from different disciplines.

2.2.4.1 20th Century Theories of Learning

Dating back to the 1950s to 1960s, the most prevailing theory of human behavior was steered by the *behaviorist* doctrines of such key psychologists as Watson, Hull and Thorndike; **behaviorism**, which expressed a Pavlovian view of human learning, reached its heyday in the work of B. F. Skinner (Kelly, 1997; Jensen, 1998b) and contributed to the establishment of the behaviorist model of language education. Traditional behaviorists, adopting a reductionist, stimulus-and-response approach which was based in empiricism, believed that language learning was a consequence of imitation, practice, reinforcement (reward and punishment), and habit formation (Lightbown & Spada, 1999). They measured behavior and found ways to modify it with behavior reinforcers, for they did not know what was going on inside the brain,

and so what they would possibly lay their hands on was the external stimuli and behaviors. Nevertheless, such view provides no ground for some observations of the developmental stages that children naturally go through (see Ginsburg, & Opper, 1969).

In the sixties and seventies, there was a major paradigm shift from a reductionist view to a non-reductionist one in psychology through the work of Piaget, concerning child development and schema, and Gagne, with regard to the eight categories of learning (see Travers, 1977; cited in Kelly, 1997). On the other hand, in linguistics, in reaction to the inadequacy of the behaviorist theory of learning, Noam Chomsky introduced his work of transformational grammar which also induced a similar paradigm shift. Chomsky claimed that "children are biologically programmed for language and that language develops in the child in just the same way that other biological functions develop" (Lightbown & Spada, 1999: 15), and this is known as the **innatist** position. The *Critical Period Hypothesis* (see Lenneberg, 1967) proposed in the theory has been controversial, but neuroscientists have dealt with the issue based on some brain research findings and came up with a "sensitive period[5]".

The situation has much changed in the past two decades. Thanks to the technological advancement, a new paradigm of brain research into neural functions has emerged, using non-invasive brain imaging techniques and physically and neurologically healthy subjects, which contributed to the rapid development of neuroscience. **Neuroscience** has developed into a kind of "inner science," taking an interdisciplinary approach to examining the brain (Jensen, 1998b). "The way we perceived, attend to, process, and memorize information is the heart of the issue of

[5] "Sensitive periods" or "windows of opportunity" are defined by some neuroscientists (e.g., Harry Chugani and Michael Phelps) as a time frame in which a particular biological event is likely to occur best (Wolfe & Brandt, 1998), while "critical period" refers to a specific and confined time period for language acquisition, when missed, the language learner will suffer immense difficulty in acquiring the

applying brain research to education" (Verner, 2001). Related to the rapid development of neuroscience is a growing idea of relating neuroscience to language education. There is a growing belief that brain research could influence from classroom instruction to the design and construction of a new school (e.g., Covino, 2002). Today, brain research is starting to provide neurocognitive information to confirm what many educators have known intuitively for years: "Children learn better and remember more when their studies are mixed with music and drama, experience, emotion and real-world context" (Covino, 2002:5). "The findings from neuroscience are now validating scientifically much of the new instructional strategies being advocated in educational reform efforts since the 1960s" (*Brain-based Learning Design Principles*).

There are several learning theories around the 90s' that utilized the findings of the brain research. For example, McCarthy's (1987) **Right versus Left Brain Learning**, Herrmann's (1989; 1995) **Whole Brain Teaching and Learning**, and Caine and Caine's (1990; 1997) **Brain-based Learning Theory** (also Hart, 1975; O'Keefe & Nadel, 1978; Hand, 1984; Diamond & Hopson, 1998; Wolfe & Brandt, 1998; Jensen, 1998b; Politano & Paquin, 2000; Roberts, 2002).

2.2.4.2 Right versus Left Brain Learning

The right versus left brain approaches to learning have been researched and described by a number of researchers, for instance, McCarthy (1987) proposed a 4MAT model for teaching. It is a learning styles theory which emphasizes that individuals *perceive* and *process* information in different ways. The assumption of this model is different students would have different preferred learning styles. It was suggested that students would learn more when the educational experience is geared toward their preferred

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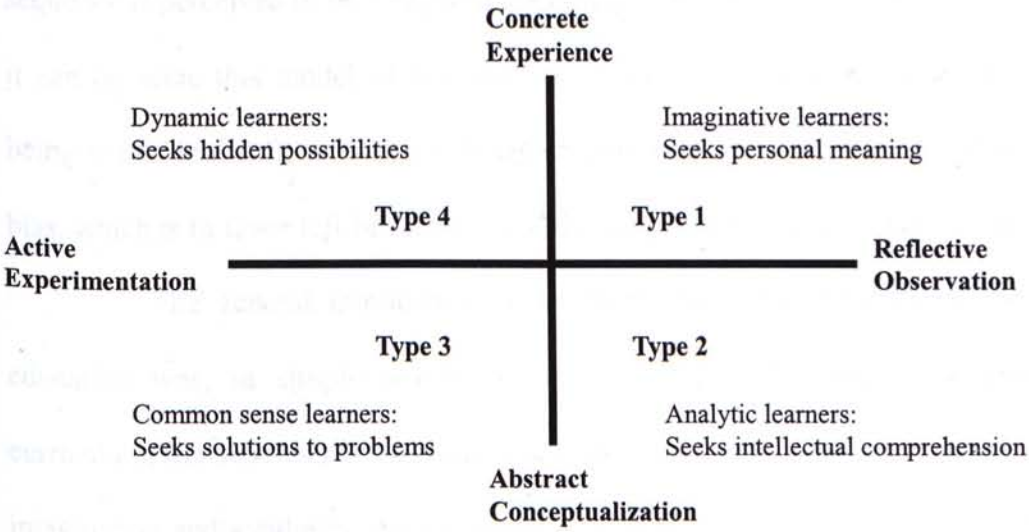
language (Lightbown & Spada, 1999).

style of learning and when the learning processing operates through a cycle of different **learning styles**, which McCarthy coined as a 4MAT System (see Fig 2.3).

Fig 2.3 McCarthy's (1987) 4MAT model: Description of the Four Learning Styles



The 4MAT model explains the combinations of the perceiving and processing techniques that constitute 4 kinds of identifiable learning styles and the characteristics of the respective types of learners (McCarthy, 1987). Type 1 learners are the *imaginative* ones who are "primarily interested in personal meaning"; Type 2 are *analytic* ones who are "primarily interested in the facts as they lead to conceptual understanding"; Type 3 are *common sense* learners who are "primarily interested in how things work"; Type 4 are dynamic learners who are "primarily interested in self discovery" (McCarthy, 1987:90). Fig 2.3 shows the vertical continuum of perceiving information (from concrete—for feelers to abstract—for thinkers) and the horizontal continuum of processing information, which forms 4 learning style quadrants.

The 4MAT model also recognizes two kinds of brain processing—right- and left-mode processing, the research of which began with Dr. Roger Sperry in the 1950s. The characteristics of left-mode processing are, to name a few, rational, logical, sequential, objectives, and looks at parts, while the right-mode ones are holistic, random, intuitive, subjective, and looks at wholes. A complete 4MAT

suggests that teaching to each of the four learning styles would use the right- and the left-mode techniques. The 4MAT teaching system moves through the learning styles quadrants in a sequence by applying suitable right- and left-mode techniques and the sequence is perceived to be a "natural learning progression" (McCarthy, 1987: 90). As it can be seen, this model of teaching stresses both hemispheres of the brain (i.e., being whole-brained), without overweighing either side, as opposed to what schools bias, which is to favor left-brain modes of thinking (*Right Brain vs. Left Brain*).

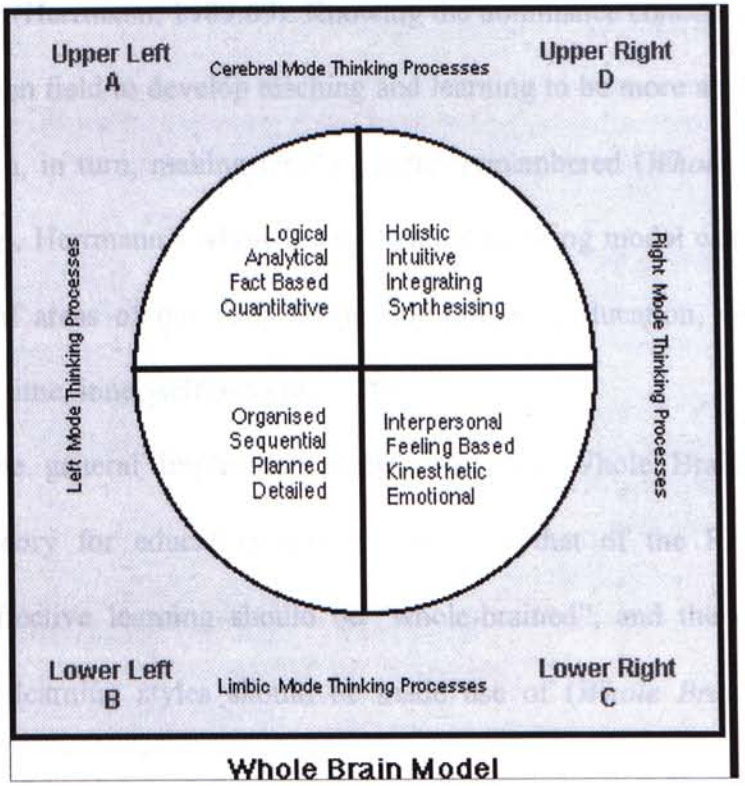
The general implication drawn from the Right/ Left Brain Theory for education was, in simple words, to be more "whole-brained". Concerning the curriculum, the schools need to have a balance in the arts, creativity, and the skills of imagination and synthesis. As for instruction, teachers are advised to use instruction techniques that connect with both hemispheres of the brain. And, the assessment of the students' learning should take new forms that give honor to the right-brained talents and skills (*Right Brain vs. Left Brain*).

2.2.4.3 Whole Brain Teaching and Learning

Herrmann's (1989; 1995) Whole Brain Model has a lot of commonalties with McCarthy's 4MAT model. Herrmann's model also draws on Sperry's (1976) Left/Right brain theory (Trotter, 1976) and combines it with MacLean's (1969, 1978) Triune Brain Theory[6] to invent a quadrant model of the brain with each quadrant specified by a thinking process/ mode, which is a metaphorical representation of how human beings think (see Fig 2.4). The assumptions of the Whole Brain Model or Teaching and Learning Approach is that people have different preferred modes of thinking and learning, which affect how we process, store, retrieve, and make meaning out of the information.

[6] The Triune Brain Theory postulates that the human brain, in reality, consists of three brains, which are

Fig 2.4 Whole Brain Model of Four Distinct Thinking Styles
(http://members.ozemail.com.au/caveman/creative/brain/herrmann.htm)



The left, upper (cerebral) quadrant of thinking is analytical, mathematical, technical, and problem-solving; the left, lower (limbic) quadrant of thinking is controlled, conservative, planned, organized, and administrative in nature; the right, lower (limbic) quadrant of thinking is interpersonal, emotional, musical, spiritual, and the "talker" mode; the right, upper (cerebral) quadrant of thinking is imaginative, synthesizing, artistic, holistic, and conceptual. One concept not to overlook in the model is *dominance*, which is in connection with the asymmetrically physiological functions of the two hemispheres of the brain, and explains why humans are likely to have specific preference of one mode over another. In 1979, Herrmann developed an instrument, the Herrmann Brain Dominance Instrument (HBDI), which measures which type of mental activity a person is more inclined to engage in at a certain time. However, it is of primary importance to note that "every quadrant brings critically

(i) an ancient, primitive reptilian brain, (ii) the limbic, mammalian brain, and (iii) the limbic brain that lies the neocortex.

important contributions to effective living and working," so there is not a "right" type of dominance (Herrmann, 1989:69). Knowing the dominance concept can help people in the education field to develop teaching and learning to be more applicable to every student, which, in turn, making learning better remembered (*Whole Brain Teaching and Learning*). Herrmann's whole brain learning/ teaching model can be applied to a wide range of areas of our daily living, for instance, education, work, the use of discretionary time, inner-self perception, etc.

The general implication drawn from the Whole Brain Teaching and Learning Theory for education was in line with that of the Right/ Left Brain Learning—effective learning should be "whole-brained", and the different mental processes or learning styles should be made use of (*Whole Brain Teaching and Learning*).

2.2.4.4 Brain-based Learning Theory

Like the previous two brain-related learning theories, brain-based learning theory sees learning through the structure and functions of the brain. Brain-based learning is "a natural, motivating, and positive way of maximizing learning and teaching" (Politano & Paquin, 2000: 1). According to Caine and Caine (1990: 69), "the objective of brain-based learning is to move from memorizing information to meaningful learning." They proposed a model that serves to summarize the difference between *traditional* vs. *brain-based teaching* (Caine & Caine, 1991: 124) as shown below:

Table 2.1 Comparison of the "Traditional" and "Brain-based" Teaching Models

Elements of Orchestration	Traditional Teaching	Brain-based Teaching
Source of information	**Simple**. Two-way, from teacher to book, worksheet, or film to student.	**Complex**. Social interactions, *group* discovery, individual search and reflection, role playing, integrated subject matter.
Classroom organization	**Linear**. Individual work or teacher directed.	**Complex**. Thematic, integrative, *cooperative*, workstations, individualized projects.
Classroom management	**Hierarchical**. Teacher controlled.	**Complex**. Designated status and responsibilities delegated to students and monitored by teacher.
Outcomes	**Specified** and **convergent**. Emphasis on *memorized* concepts, vocabulary, and skills.	**Complex**. Emphasis on reorganization of information in unique ways, with both predictable outcomes, divergent and convergent, increase in natural knowledge demonstrated through ability to use learned skills in variable contexts.

Note. Freely adapted from Caine and Caine (1991: 124).

Brain-based Learning Principles

Caine and Caine (1990) synthesized brain research findings into a set of twelve brain/ mind learning principles serving as a general foundation for *brain-based learning*, from which some teaching implications were drawn. Jensen (1998a, b) adopted a brain-compatible approach to learning and viewed learning through similar angles; but unlike Caine and Caine, he did not come up any learning principles. Many of the principles proposed in Caine and Caine's (1990) brain-based learning framework are interconnected, just as the way a learner's brain is (listed below).

(1) The brain is a *parallel* processor.
(2) Learning engages the entire *physiology*.
(3) The search for *meaning* is innate.
(4) The search for meaning occurs through *patterning*.
(5) *Emotions* are critical to patterning.
(6) Every brain simultaneously perceives and creates *parts* and *wholes*.
(7) Learning involves both focused *attention* and peripheral *perception*.
(8) Learning always involves *conscious* and *unconscious* processes.
(9) We have at least two different types of *memory*: A spatial memory system and a set of systems for rote learning
(10) We understand and remember best when facts and skills are embedded in natural, *spatial memory*.
(11) Learning is enhanced by *challenge* and inhibited by *threat*.
(12) Every brain is *unique*.

The first principle is that **the brain is a parallel processor** (Caine & Caine, 1990; Roberts, 2002). The brain constantly performs many functions simultaneously (Ornstein & Thompson, 1984, cited in Caine & Caine, 1990: 66), such as smelling and tasting. That means, the human brain is a *multi-tasking* machine, ceaselessly doing several things at one time (Roberts, 2002). Thoughts, emotions, imagination and predisposition operate concurrently and interactively as the other systems or neural processes of the brain interact with one another (Caine & Caine, 1990). An implication for educators is that good teaching should "*orchestrate*" all the dimensions of parallel processing, encompassing a variety of strategies and techniques, in order to engage the students' brains and fully immerse the students in an educational experience (*Brain-based learning*, 1998-2001; *Principles of Brain-Based Learning*, 1999).

The second principle is that **learning engages the entire physiology** (Caine & Caine, 1990). The brain operates complex functions naturally according to physiological rules; learning is as natural as breathing; however, it can be inhibited or facilitated, since neuron growth, nourishment, and interactions (the evidence of learning in the brain) are integrally related to how experiences are perceived and interpreted. *Stress*, *threat*, *challenge*, *peace*, *boredom happiness* and *contentment* all have different influences on the brain (Ornstein & Sobel, 1987, cited in Caine &

Caine, 1990: 66). In short, anything that has an effect on our physiological functioning would have an effect on our capacity to learning. Here, one of the implications for educators is that "brain-based teaching must fully incorporate stress management, nutrition, exercise, drug education, and other facets of health into the learning process" (Caine & Caine, 1990: 66).

The third principle is that **the search for meaning is innate** (Caine & Caine, 1990). The brain is a meaning-maker (Jensen, 1998b) and making meaning is survival-oriented and basic to humans. There are two types of meaning: reference and sense meaning (Kosslyn, 1992), and, in another case, "surface" or "deeply felt" (Caine & Caine, 1994). Yet, only the deeply felt meanings are built in and hard wired into our brains. It is posited that *relevance*, *emotions*, and *context and pattern making* are the major ingredients of meaning (Jensen, 1998b). Moreover, the brain registers automatically the familiar while simultaneously searching for and responding to novel stimuli (O'Keefe & Nadel, 1978, cited in Caine & Caine, 1990: 67). Implications for educators would be that learning is impeded when devoid of reason or aim and when it is not linked up with our personal needs (Jensen, 1998b), and brain-based education must furnish a *rich* learning environment that provides *stability* and *familiarity*, while satisfying, on the other hand, the curious brain that hungers for *novelty*, *discovery*, and *challenge* (Caine & Caine, 1990).

The fourth principle is that **the search for meaning occurs through "patterning"** (Caine & Caine, 1990; Roberts, 2002). The brain is intended for perceiving and creating patterns, and it resists being imposed meaningless patterns. Meaninglessness arises from isolated pieces of information that could hardly make sense to the person. In fact, much of what goes to our brain cannot be processed consciously, because it happens too fast (Jensen, 1998b). Humans are natural

meaning-seeking organism as mentioned before, but the generation of new meaning through patterning requires time. Implications for educators are as the following: educators should influence the direction of patterning of the learners (instead of imposing patterns, they should present the information in a way that allows the brains to extract and derive patterns); also, meaning always comes from within, not externally (Jensen, 1998b). After each new experience, time is needed to solidify; moreover, to consider how small activities might be *chunked*, so as to present the learners with information in an organized, meaningful manner, whereas a *big picture* can be offered at the beginning of the learning experience (Roberts, 2002).

The fifth principle is that **emotions are critical to patterning** (Caine & Caine, 1990; Wolfe & Brandt, 1998; Jensen, 1998b; Roberts, 2002). Learning is influenced and organized by emotions and mind-sets that involve expectancy, personal biases and prejudices, self-esteem, and the need for social interaction. Consequently, emotions and cognition cannot be separated. Emotions and meaning are linked; we remember what is mostly emotionally laden (Jensen, 1998b). Emotions are generated from biologically automated "superhighways" of the brain. They are joy (pleasure), fear, surprise, disgust, anger, and sadness. The principle implies that teachers should, in the first place, understand that students' *feelings* and *attitudes* would be an influential part of their learning, which can determine future learning (Caine & Caine, 1990). Furthermore, they should ensure that the emotional climate in the classroom is supportive and marked by mutual respect and acceptance, and *cooperative learning* supports this notion. In this case, getting students into groups provides a superb vehicle for social and academic feedback, which encourages emotions.

The sixth principle is that **every brain simultaneously perceives and**

creates parts and wholes (Caine & Caine, 1990). Brain laterality exists (there are differences in the two halves of the brain), which, however, does not present the whole picture. The two hemispheres are inextricably *interactive*, regardless of whether a person is dealing with words, mathematics, music, or art (Hart, 1975; Hand, 1984, cited in Caine & Caine, 1990: 67). One of them is to reduce information into parts, with the other, the information is perceived as a whole or series of wholes. An implication for educators would be that good teaching necessarily builds understanding and skills over time, acknowledging that learning is cumulative and developmental. As a consequence, vocabulary and grammar are best understood and mastered when they are embedded in genuine, whole-language experiences.

The seventh principle is that **learning involves both focused attention and peripheral perception** (Caine & Caine, 1990). The brain absorbs the information of which it is directly aware of, but it also directly absorbs information and signals that lie beyond the center of focus. The brain responds to the entire sensory context in which teaching and learning occur. An implication for educators would be that all aspects of an educational environment are important. *Art* exhibits should be changed frequently to reflect changes in learning focus and *music* has also become an important means to enhance natural acquisition of information (Caine & Caine, 1990; *Brain-based Learning Design Principles*). Furthermore, the contrasts of movement, sounds, and emotions (like threat) trigger and consume most of our attention but "constant attention is counterproductive" (Jensen, 1998b: 46).

The eighth principle is that **learning always involves conscious and unconscious processes** (Caine & Caine, 1990). As related to the preceding principle, much of our learning is unconscious or beyond our awareness. "We learn much more than we ever consciously understand" (p. # 68). Our experiences turn into part of our

prior knowledge in both conscious and unconscious ways. This principle implies that teachers should facilitate "*active processing*" which enables students to review how and what they learned so that they can take charge of their learning, and time should be given to the students to do the reflections. (Caine & Caine, 1990; *Brain-based Learning Design Principles*). Metacognitive activities would be useful which help students to realize their preferred learning styles.

The ninth principle is that **we have two types of memory: A spatial memory system and a set of systems for rote learning** (Caine & Caine, 1990). As pointed out by Jensen (1998b: 14), "learning and memory are two sides of a coin to neuroscientists", as the only evidence of learning is memory. We have a natural, spatial memory system which does not need rehearsal and is open for "instant" memory of experiences (see, for example, Nadel & Wilmer, 1980, cited in Caine & Caine, 1990: 68). It is always engaged, inexhaustible, and motivated by novelty. The counterpart of the spatial memory is a set of systems specifically designed for storing relatively unrelated information (O'Keefe & Nadel, 1978, cited in Caine & Caine, 1990: 68). Implications for educators are that in general, teaching devoted to memorization does not facilitate the transfer of learning, which probably interferes with the subsequent development of understanding, and an overemphasis on memorization leaves the learner impoverished. By ignoring the personal world, and the preferred learning style of the learner, educators actually inhibit the effective functioning of the brain.

The tenth principle is that **we understand and remember best when facts and skills are embedded in natural, spatial memory** (Caine & Caine, 1990). Our native language is learned through multiple interactive experiences with vocabulary and grammar. It is shaped both by internal processes and by social interaction

(Vygotsky, 1978, cited in Caine & Caine, 1990: 69). Education can be improved when this type of embedding is used. The principle implies that teachers should take advantage of a great deal of real-life activity, including classroom demonstrations; project; field trips; visual imagery of certain experiences; stories; metaphors; drama; and interaction of different subjects. Grammar can be learned in process, through stories or writing. The success of teaching is attributed to the using all of the senses and immersing the learner in a multitude of complex and interactive experiences.

The eleventh principle is that **learning is enhanced by challenge and inhibited by threat** (Caine & Caine, 1990; Jensen, 1998b; Roberts, 2002). The brain makes maximum connections when risk taking is encouraged and supported; however, it "downshifts" when under perceived threat. The brain responds to threats in predictable ways—the moment a threat is detected, the brain jumps into "high gear" (Jensen, 1998b). It immediately alters the way we think, feel and act. Research has revealed that threatening environments can trigger chemical imbalance in our brain. On the contrary, challenge places a positive effect on learning. As a matter of fact, too much or too little challenge will get the students either give up or fall asleep. An implication for educators would be that creating a safe place to think and risk (or *relaxed alertness*) is essential for optimum learning. The threat of failure and/or low grades may hinder rather than encourage learning (Caine & Caine, 1990). In addition, it is indicated that "the critical ingredients in any purposeful program to enrich the learner's brain are that first the learning is challenging, with new information or experiences" (Jensen, 1998b: 33). The threat levels should be lowered early in the program, by relationship building both peer-peer and teacher-students, and sixty percent of the activities in class should be ritual based, while the other approximately forty percent should be ensured to be novel materials (Roberts, 2002).

The twelfth principle is that **every brain is uniquely organized** (Caine & Caine, 1990). All humans have the same set of systems, yet we are all different based on genetic endowments, differing prior knowledge, and differing environments. The more we learn, the more unique we become. Implications for educators are as the following: teaching should be *multifaceted* to create room for students to express visual, tactile, emotional, or auditory preferences; learners are all different and thus need to be empowered to make choices and allowed to understand the world from their own unique intelligences; providing choices that are variable enough to attract individual interests may require reshaping of schools so that they exhibit the complexity found in life (Caine & Caine, 1990; *Brain-based Learning Design Principles*).

To sum up the twelve principles for planning what educators and schools should do, three interactive elements were proposed to reflect the interlocking relationship of the principles and the corresponding educational advice: relaxed alertness, immersion, and active processing (Caine & Caine, 1989; 1997). These elements can be appreciated in all knowledge domains "where genuine understanding and natural knowledge are desired" (Caine & Caine, 1997: 32). *Relaxed alertness*, considered as a state of mind optimal for learning, can be achieved by a delicate balance in which threat is eliminated while maintaining significant challenge for the learners—to establish an environment that nourishes safe risk taking and active attention. *Orchestrated immersion* refers to bringing together effectively the various elements of experiences that are "compelling" (i.e., immensely varied that contain both unpredictable and predictable elements)—to help students "breathe" in knowledge in the learning environments orchestrated with different learning elements, which build up their whole sense of learning and determine the degree of learning.

Active processing, as the basis for the making of meaning, refers to the consolidation, internalization and reflection of information, by the learner, in a way that is both personally meaningful and conceptually coherent.

Adding to the three interactive elements above, Jensen (1998b) posited that an **enriched environment** is regarded as a significant catalyst that makes learning happen. Enrichment brings increased neural stimulation and thus changes the structure of brain cells by nurturing a greater number of networks—this is a cause for an enhanced learning capacity. Wolfe and Brandt (1998) pointed out that Marian Diamond and her colleagues at the University of California at Berkeley conducted a pioneering study of the brain structures which were found to be modified by the environment, and established the concept of neural plasticity, which is defined as the brain's ability to change its structure constantly and function in response to external experiences (Diamond & Hopson, 1998). According to Diamond, the notion of *enriched environment* includes the following:

- A steady source of positive emotional support
- Provides a nutritious diet
- Stimulates all the senses
- Has an atmosphere free of undue pressure but suffused with a degree of pleasure intensity
- Presents a series of novel challenges that are neither too easy nor too difficult for the child at his or her stage of development
- Allows social interaction for a significant percentage of activities
- Promotes the development of a broad range of skills and interests that are mental, physical, aesthetic, social, and emotional
- Gives the child an opportunity to choose many of his or her efforts and to modify them
- Provides an enjoyable atmosphere that promotes exploration and fun of learning
- Allows the child to be an active participant rather than a passive observer

(Diamond & Hopson, 1998, cited in Wolfe & Brandt, 1998: 11)

Task-based Teaching and Learning

Brain-based educational methodologies need not to be reinvented. Task-based teaching and learning, for instance, can serve as an example. Foster (1999) pointed out that the task-based approach to language teaching reacts to a contemporary view of learning, based on research findings in both linguistics and psychology: language

learning is a developmental, natural process that has its own internal agenda. The main idea of task-based approaches is to give learners tasks to transact (instead of items to learn) which provides an environment which best enhances the natural language learning process. Engaging the learners in meaningful activities (e.g., problem-solving, discussion, or narratives, etc.) could stretch and develop the learners' interlanguage systems. This goal and practice are very much in line with the educational implications of the brain-based learning principles reviewed above (in particular, brain-based learning principle 3 & 10, which highlights the importance of *meaning* and *natural, multiple interactive experiences* in students' learning). Overall speaking, task-based approaches actualize the spirit of the brain-based learning theory in a way that the teaching-learning environment is shifted from a teacher-focused one to a more student-centered one.

To give a brief definition of "task", Long (1985) considers tasks as something people do in daily life, at work, at play, and in between. Skehan (1998:268) gives four defining criteria for "task" as follows: meaning is primary; there is a goal which needs to be worked towards; the activity is outcome-evaluated; and there is a real-world relationship.

Cooperative Learning

Another example of a brain-based educational methodology could be cooperative learning. Caine and Caine (1991:121) stated that cooperative learning "builds on and enhances the capacities of people to communicate and collaborate", which requires a process of generating group relationships so that the groups members can support one another (see also Olsen & Kagan, 1992). It is a teaching strategy that establishes small teams, each of which has students of different levels of ability, and uses a variety of learning activities to improve students' understanding. It would be optimal for the

group to share the responsibility for the learning of each student.

There are several key elements of cooperative learning: (1) positive interdependence, (2) team formation, (3) accountability and (4) mastery of social skills (e.g., Olsen & Kagan, 1992; Johnson & Johnson, 1999; Kluge, 1999; *Cooperative Learning*, b) By "positive interdependence" is meant the group members can succeed/ meet their goals only when all members contribute, and the group is structured according to this purpose. "Team formation" refers to grouping students to accomplish tasks, and "accountability", however, is implied for both the individuals and the group, meaning that all members in the group need to finish the task before the group moves on to the next. "Mastery of social skills" (e.g., leadership, decision-making, trust-building, and communication skills, etc.) are necessary for effective cooperative learning. There are a number of classroom activities, such as "Think-Pair-Share", which could become patterns for student interaction (also called structures), and that the students would immediately know what type of interaction to expect (*Cooperative Learning*, a & b). This Think-Pair-Share activity involves a three-step cooperative structure: first, the individuals think independently about a question posed by the instructor; second, they find a partner to pair up and exchange thoughts; third, the pairs share their responses with other pairs, other teams, or the entire group to complete understanding.

Discussion on the Three Reviewed Theories

The gist of each brain-based learning principle has been presented and the most crucial concept in three reviewed theories, McCarthy's (1987) Right/ Left Brain Learning, Herrmann's (1995) Whole Brain Learning and Teaching, and Caine and Caine's (1990) Brain-based Learning Theory, will be addressed in this section.

McCarthy's 4Mat model and Herrmann's Whole Brain Learning Model

both place students' *learning styles* and *preferences* determined by the brain's processing mechanisms at the heart of the theories. Both McCarthy (1987) and Herrmann (1989; 1995) suggested that teaching should encompass all four learning styles proposed in their models (For details of specific techniques/ strategies, see McCarthy (1987) and Herrmann (1989; 1995).

When the Brain-based Learning Theory is compared with the Right/ Left Brain Theory and the Whole Brain Teaching and Learning Theory, it can been seen that the Brain-based Learning Theory not only develops around the structures and principles of brain functioning as McCarthy's and Herrmann's theory do, but it also works along with the educational variables to a greater extent (in particular, students' emotions and attitudes, or the affective aspect of learning). It should be noted that these principles, with neurocognitive evidence, do support some long-standing practices in the educational field. Further, the brain/ mind learning principles can contribute most in the way of illuminating how to establish the teaching and learning *environment/ context*. Nonetheless, the brain-based learning principles with their various pedagogical implications inform the educators of only what to do, but exactly how to do it in curriculum and pedagogical terms needs further exploration.

2.3 Affective Domain of Learning

In this review section, the learning attitudes and motivation from an education angle will be discussed first. Then, from the neuroscientific perspective, how learning is affectively influenced will be discussed and summarized.

2.3.1 Learning Attitudes and Motivation in Language Education

The role of *attitudes* and *motivation* in second language (L2) learning has been extensively researched, and these two terms often appear together. According to

Gardner's socio-psychological model of L2 learning, "[motivation] in L2 learning has, instead, chiefly been used to refer to long-term stable attitudes in the students' minds, in particular integrative and instrumental motivation" (Gardner & Lambert, 1972; Gardner, 1985, cited in Cook, 2001: 115). Deci and Ryan (1985) provided another theory of learner's motivation, which is the Self-Determination Theory (SDT). In the theory, different types of motivation are distinguished on the basis of different reasons or goals to which an action is attributed. In general, "to be motivated means to be moved to do something" (Ryan & Deci, 2000: 54), and the fundamental distinction is between *intrinsic* and *extrinsic* motivation: the former denoting that doing something for its own sake because of the inherent interest in it, and the latter referring to doing something for a separate outcome from the activity. The key argument in the theory is that self-determination (the locus of causality for the behavior internal to the learner) results in intrinsic motivation.

As regards motivation in a classroom setting, Lightbown and Spada (1999) suggested that our classroom places could be made where students enjoyed coming because the content was interesting and relevant to their age and level of ability, where the learning goals were challenging, yet manageable and clear, where the learning atmosphere was supportive and non-threatening, and where a positive contribution could be made to enhance students' motivation to learn.

2.3.2 Learning Attitudes and Motivation in Neuroscience

According to Shizgal (1999: 566), "[motivation] is a modulating and coordinating influence on the direction, vigor, and composition of behavior". Jensen (1998b) pointed out that the brain is naturally designed for pursuing novelty and curiosity, looking for relevance, and bathing in feedback from success. Thus, he encouraged the promotion of intrinsic motivation. Most students are already intrinsically motivated,

which, however, is very content dependent. The answer to how we motivate learners lies in a several factors that researchers presented: compelling goals, positive beliefs, and productive emotions (see Ford, 1992). The students have to be taught in the way that they *love* to learn.

The affective side of learning is the domain of *emotions* (Jensen, 1998b). Wolfe & Brandt (1998:13) observed that "[learning] is strongly influenced by emotion", and Caine & Caine (1990: 67 & 69) remarked that "emotions are critical to patterning" and "learning is enhanced by challenge and inhibited by threat". Being an integral part in memory encoding, emotion performs a dual role in human learning (LeDoux, 1996, cited in Roberts, 2002: 283). First, we remember what is mostly emotionally laden (Jensen, 1998b); the stronger the emotion is associated with the experience (for example, the situation is perceived by the learner as challenge), the stronger the memory of the experience (Wolfe & Brandt, 1998). Second, emotions have an up and down side. If, for example, the emotion is too strong (e.g., the learner perceived as a threat), a downshift in mental functions will be induced and then memory and learning are accordingly decreased (Wolfe & Brandt, 1998).

Jensen (1998b: 80) advised as follows: "The old adage was, 'First, get control of the students, then do the teaching.' Today, neuroscientists might tell you to engage emotions appropriately at every chance you get."—to embrace emotions as an inseparable part of teaching. Bergen and Coscia (2001) proposed that the emotional development of a child could be considered as an educational goal. As children's brains mature, they gain the capacity to label, categorize, and interpret emotions, and these processes in turn affect what cognitive, linguistic, and social meanings they encoded. Consequently, educators could make use of this piece of brain fact by providing experiences embedded in positive emotional contexts to enhance the

learning of important content.

Summary

The language-teaching and the neurocognitive view on learning attitudes and motivation have been explicated, and, the respective suggestions, on the whole, agree with each other. The education view sees motivation and learning attitudes through the learners' intention of learning, while the neuroscientific view supplements the education one by stressing that the human is essentially and innately curious and hungry for meaning, which should be perceived as giving the educators some encouragement in promoting intrinsic motivation. However, it has to be pointed out that if motivation in L2 learning has been interpreted as the *long-term* and *stable* attitudes in the students' minds, it might be in conflict with the neurocognitive view, which suggests that the brain is not immutable or fixed at birth. The environment is a crucial factor constantly modifying our brain structures; the malleable brain can modify its structure and functions in response to the external experiences and stimuli. This is exactly the reason why the learning environment should be an enriched one (c.f. Section 2.2.4.4).

2.4 Converging Education and Neuro-cognitive Findings of "Actional" and "Pictorial" Inputs and Brain-based Learning Theory

In the education field, it is claimed that the Total Physical Response approach could bring enhancement to *listening* comprehension, which is evidenced in the elevated physical response of the research subjects to the verbal commands, and the effectiveness of the visual approach has been proved in the studies on *reading* comprehension. In both the education and the neuroscience fields, there have been no studies comparing the effectiveness of the "actional" and the "pictorial" input.

Specifically, there has been no research to discern the effects (or learning outcomes) of adopting the "actional" and the "pictorial" approach to language teaching in general (or to other language skill areas in particular, e.g., *vocabulary learning*). However, as the neurocognitive studies have investigated and recorded the brain areas activated to the "actional" and the "pictorial" input, we can see that the brain mappings for the cognitive processes corresponding to the two input models are rather different, and (language) learning is dependent on the neural connections and performing of different brain functions (or cognitive processes) (c.f. Section 2.2.1). It would be interesting, therefore, to study the learning outcomes brought about by the two pedagogically and neurocognitively different input models. It was expected that the learning outcomes on both the knowledge and behavioral basis would have marked discrepancies between two groups of learners receiving different input models.

Further, the Brain-based Learning Theory (c.f. Section 2.2.4.4) offers directions to provide the best for the learners in terms of the learning atmosphere, environment, and classroom organization, which could maximize learning. In order to explore whether the difference in the brain regions responsible for the cognitive processes of the "actional" and "pictorial" input would be manifested in an educational setting, it was necessary to set up a study, which incorporated the essential teaching element/ content of Total Physical Response strategy (i.e., *action verbs*), and a brain-based teaching context/ environment, grounded on Caine and Caine's (1990) brain/ mind learning principles and the brain-based educational methodologies (i.e., *tasked based teaching and learning* and *cooperative learning*). Other than the evaluation of the subjects' learning of action verbs, whether their learning attitudes changed was equally crucial, which provided another angle to assess the effects the

brain-based programs in association with the "actional" and the "pictorial" input model had on the subjects.

2.4.1 Research Questions

The research aimed to gauge and document the effects of the "*actional*" and the "*pictorial*" input model, in the respective Brain-based English Activity programs (BEAPs), on two groups of Hong Kong Chinese Primary/ Grade three EFL students' learning of English *action verb*s and learning attitudes, and to provide educational implications in relation to the teaching and learning of English (action verbs) for the TEFL profession. Below are the research questions formulated for such purposes:

1. Will such Brain-based English Activity Programs bring enhancement to subjects' learning of English action verbs?
2. Which model of input will bring greater enhancement to subjects' learning of the English action verbs, **"actional"** or **"pictorial"** input?
3. Will such Brain-based English Activity Programs pose positive effects on the subjects' perceived English abilities and attitudes towards English (learning)?
4. Which model of input will pose more positive effects on the subjects' perceived English abilities and attitudes towards English (learning), **"actional"** or **"pictorial"** input?

Chapter 3

THE FIRST STUDY

3.1 Introduction

This chapter describes the most essential information of the first study of the Brain-based English Activity Programs for two groups of subjects: the research design, the implementation, the test results of the subjects, and the findings. A discussion of the *linguistic* (the knowledge of action verbs gained) and the *affective* (the attitudinal change) effects of the experimental treatment on the subjects will also be presented. Suggestions for the design of the second study will be made towards the end of this chapter.

3.1.1 An Overview of the Design of the First Study

For an overview of the details of the study design, the table below summarizes the most important information of the aspects to be reported in the coming sections:

Table 3.1 Design of the First Study

Theoretical Framework	"Brain-based": "**Actions**" and "**Pictures**"
Aims	• To investigate how different the two input models in the brain-based English Activity Programs which focused on action verb learning would be • To offer suggestions for teachers who wish to teach English (action verbs)
Subjects	Local primary three students Lower intermediate English proficiency level Number: 28 (M: 21; F: 7)
Number of Subject Groups	2 (14 students/ group) Action Group Picture Group
Teaching-Learning "Context"	English language programs Brain-based (grounded on brain-based learning principles): • Task-based: learning tasks as lessons • Group-based: cooperative learning
Teaching "Content"	69 action verbs ("learnt": 43; new: 22)
Teaching Crew	One teacher (for two groups) 2 teaching assistants
Methods of Data Collection	1. Pre- and post-test 2. Post- program questionnaire survey of the subjects
Actual Teaching Time	14 hours (1.5 hours/ session)
Duration	2 successive weeks (10 days)

3.2 Design of the First Study

The research adopted an experimental design (see Selinger & Shohamy, 1999: 89). The theoretical framework of the present study employed the brain mapping of "actions" and "pictures" (c.f. Section 2.2.2 & 2.2.3) and the *Brain-based Learning Theory* (c.f. Section 2.2.4.4). As a result, the "context" of the English language programs was shaped by the brain-based learning theory (with reference to the brain-

based learning principles, task-based and group-based teaching-learning approaches) and the "content" was modeled on the materials used in the Total Physical Response strategy, which were action verbs (c.f. Section 2.1.1). The aims of the first study were to investigate how *different* the "actional" and the "pictorial" input models in the brain-based English Activity Programs would be and to offer suggestions for teachers who wish to teach English (action verbs).

3.2.1 Research Hypotheses

The research questions (c.f. Section 2.4.1) were interpreted and turned into six specific, null hypotheses addressing the more group-specific information about the learning outcomes of the Brain-based English Activity Programs on the Action and the Picture Group subjects as follows:

Hypothesis 1 (H_0): The "actional" input will not enhance subjects' learning of English action verbs.

Hypothesis 2 (H_0): The "pictorial" input will not enhance subjects' learning of English action verbs.

Hypothesis 3 (H_0): There will be no significant difference in the *linguistic* effects on the Action and the Picture Group.

Hypothesis 4 (H_0): The Action Group subjects will not have better perception of their English abilities and attitudes towards English (learning) after the Brain-based English Activity Program.

Hypothesis 5 (H_0): The Picture Group subjects will not have better perception of their English abilities and attitudes towards English (learning) after the Brain-based English Activity Program.

Hypothesis 6 (H_0): There will be no major difference in the *affective* effects of the Programs on the Action and the Picture Group.

3.2.2 Subjects

Originally, thirty Primary/ Grade 3 students were recruited from a primary school, where English proficiency was considered intermediate. However, owing to some unforeseen problems, the school withdrew the support four weeks before the start of

the study, which, thus, could not be conducted in that school. An alternative school had to be found promptly. Eventually, another school was found, which was willing to offer help to provide students for the study, but on condition that the programs were to start two weeks earlier than originally scheduled (originally, there would be a month for the planned start), and without having another day for testing. The characteristics of the subjects recruited in the replacement primary school are briefly summarized in Table 3.2 below before we go into details:

Table 3.2 Characteristics of the Subjects

Subjects' background:	Chinese learners of English as a foreign language in Hong Kong, China
Educational level:	Primary/ Grade Three
Number of subjects:	28 (21 males and 7 females)
English proficiency level:	Lower intermediate

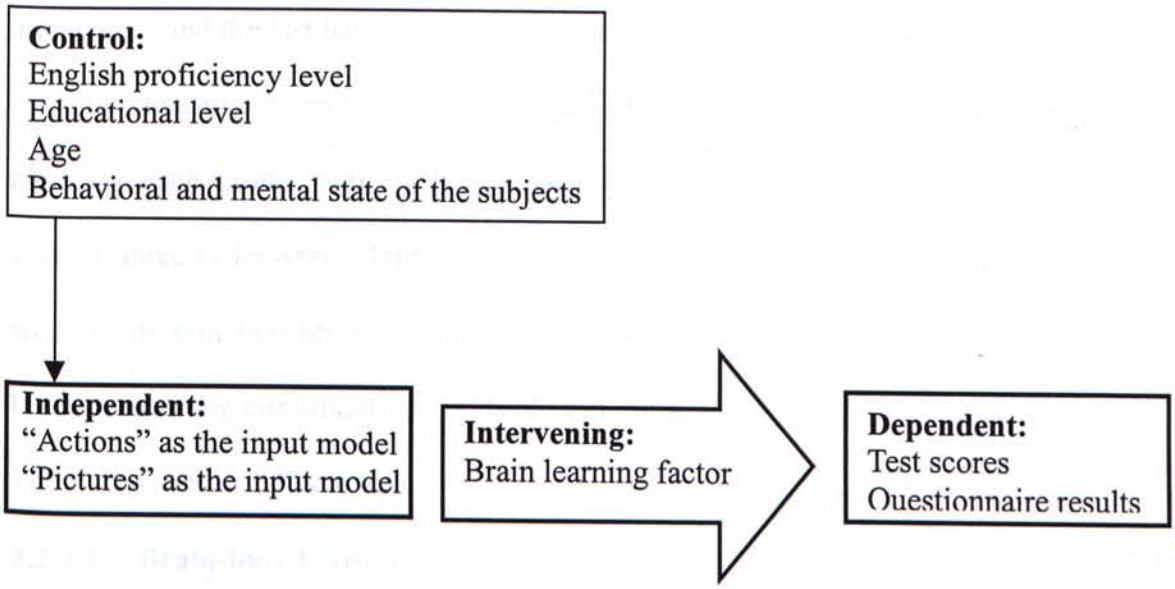
Twenty-eight Primary/ Grade 3 students were recruited, whose English proficiency was considered lower intermediate. They were learners of English as a foreign language. The selection of subjects was carried out with the following considerations: 1) the same educational level (and the same age group); 2) no reported neurological or behavioral problems; 3) voluntary enrollment into the programs. The subjects were randomized into two groups (n=14) which were matched on the pre-test average results (group 1= 9.08; group 2= 9.64) so as to eliminate extraneous variables.

The subjects' lower intermediate English proficiency was confirmed by their pre-program test mean score, which were 9.33 out of 30.00. In addition, at the beginning of the programs, the subjects could not respond to some simple action verbs, such as, *stand*.

3.2.3 Variables of the Study

To give an overview of the research design, the variables of the first study are shown below (see Fig. 3.1):

Fig 3.1 Variables of the First Study



The *independent variables* are "actions" and "pictures" as the input models that would influence the *dependent variables,* which are the subjects' test scores of the post-program attainment test and the post-program questionnaire results. The *intervening variable* is the brain learning factor. The *control variables* are English proficiency level (indicated by the knowledge of action verbs) at program entry, educational level, age, as well as behavioral and mental state of the subjects.

3.2.4 Experimental Treatment

The experimental treatment was settled in a two bi-week summer Brain-based English activity programs (BEAPs) in 2003, which aimed to help students learn English action verbs[1] and to evoke their interest in learning English through group work and activities. Learning tasks were designed for pinpointing and stimulating the subjects' brain areas endowed for "actions" and "pictures" (c.f. Section 2.2.2& 2.2.3).

3.2.4.1 Design of the Programs

The BEAPs ran from August 4 to August 15, 2003, which lasted for two weeks, five days weekly, and approximately one and a half hours daily, a total of fifteen hours. However, the first half hour of the first session was used for the pre-test and orientation, and the last half hour of the last session was taken up by the post-test. So, the actual teaching hours were fourteen. Each BEAP comprised *twenty-eight* learning tasks for each group, with each task lasting for thirty minutes. In each 1.5-hour session, three tasks were administered (thus no recess being provided): the first two were for introduction (presentation and initial practice) of the teaching materials; the last one was for consolidation (revision and subsequent practice) of the materials. There were ten sessions in total.

3.2.4.2 Brain-based Groups

There were two *brain-based* subject groups, which had the *same* brain-based teaching and learning contexts, as illustrated in the coming sections on materials development and experimental teaching. The two brain-based groups were assigned to two different classes: one taught in the morning and the other in the afternoon session separately. For the first group, physical "actions" were employed to introduce and teach English action verbs (i.e., the Action Group); for the second group, "pictures" of action (i.e., the Picture Group). It was reasoned that different stimuli would stimulate different brain areas (for finer details of the brain regions activated by the stimuli, see Section 2.2.2 & 2.2.3; for a summary, see Appendices A2 & A3). The two groups (each consisted of fourteen students) were divided into two small teams of seven students each, set up for group work (however, there were also individual work and pair work).

[1] Action verbs are "the primary tools for talking about actions" (Pulvermuller et al., 2001: 145).

3.2.4.3 Teaching Content

The teaching content was mainly *action verbs* (see Appendix B1), with *sentence comprehension* as a supplementary component. Action verbs were chosen, because they are fun to learn and can be acted out or represented by lively drawings. The subjects of the Action Group could learn the action verbs by acting them out either "normally" or in an "exaggerated" manner, while the subjects of the Picture Group could learn the action verbs by encoding (i.e., processing and remembering) the pictures of the action "performed" by lively drawn characters. The reason for having sentence comprehension as the additional content was that the BEAPs required the students to attend the sessions every day. Therefore, sentence comprehension would add some variety to and enrich the course content, which helped to avoid repeating the learning task-frames, and provided sentential contexts for the practice and use of the learnt action verbs. The 5th and the 9th session were devoted to sentence comprehension tasks.

The total number of action verbs to be learnt in the BEAPs was 69 and the proportion of new to familiar action verbs was approximately one to two (the new words are in bold as shown in Appendix B1), so that learning the action verbs would not be too great a challenge to the primary three subjects. Specifically, there were, in each task, some familiar action verbs inter-mingled with some novel ones. At the beginning of the course, more known verbs appeared to the students, so as to establish a sense of familiarity in learning. The distribution of action verbs in the learning tasks was made (see Appendix B2).

3.2.4.4 Brain-based Techniques Exploited in Materials Development and Teaching

The teaching materials development and the experimental teaching together largely determined the *brain-based* teaching-learning context of the programs. And hence, serving as a "big picture" of the design of these two aspects of the programs, the brain-based techniques exploited will be described, which can be elaborated under two interactive elements proposed in Caine and Caine's (1990) discussion of twelve brain-based learning principles: *orchestrated immersion* and *relaxed alertness* (c.f. Section 2.2.4.4).

Orchestrated Immersion

As defined in Section 2.2.4.4, "orchestrated immersion" means bringing together effectively the various elements of experiences that are "compelling" (i.e., immensely varied that contain both unpredictable and predictable elements), so as to help students "breathe" in knowledge in the learning environment orchestrated with different learning elements, which build up their whole sense of learning. The immersion environment of the BEAPs satisfied a number of brain-based learning principles (listed below). The way each (or sub-component of) technique exploited in the materials development and experimental teaching satisfied different brain-based learning principles will be elucidated.

(1) The brain is a parallel processor.
(3) The search for meaning is innate.
(4) The search for meaning occurs through patterning.
(5) Emotions are critical to patterning.
(9) We have at least two different types of memory: A spatial memory system and a set of systems for rote learning
(10) We understand and remember best when facts and skills are embedded in natural, spatial memory.
(11) Learning is enhanced by challenge and inhibited by threat.
(12) Every brain is unique.

Materials Development (see Section 3.2.5)

First, *tasked-based teaching-learning/* replacing lessons by learning tasks (c.f. Section 2.2.4.4) was adopted and the purpose was to alter the learning environment from a teacher-focused one to a more learner-centered one. Learning tasks orchestrated and diffused with different learning elements provided various opportunities for the students to experience and accomplish learning "by themselves" (c.f. brain-based principle 3). Different learning experiences were created by multi-sensory learning materials, such as drama, dance, and different kinds of childhood games into the learning tasks (c.f. brain-based principle 1), which enhanced the versatility of learning suiting the different interests of different learners (c.f. brain-based principle 12). Besides, the activities in the learning tasks (after teacher's presentation/ revision of the teaching content) were orientated for natural, spatial memory through providing teachers' demonstrations, requiring learners' active participation, and so on (c.f. brain-based principle 9 & 10). The activity frames were, on one hand, designed to be interesting and novel, and, on the other hand, also within the grasp of the students (i.e., not "too difficult" to play) (c.f. brain-based principle 11). Besides, the learning tasks kept the same structure throughout the programs which provided familiarity for the students (c.f. brain-based principle 3 also).

Second, *interesting and meaningful learning contexts* were provided. Different from the texts and stories in their textbook often written in a 3rd person perspective, the learning tasks of the programs were written for the subjects, who naturally became the "insiders" of the learning tasks (c.f. brain-based principle 3). Moreover, some of the learning contexts were based on real-life situation (e.g., "My Dog & I" and "My Birthday Party") and some were surreal (e.g., meeting an alien in school in "Helping a Martian"), which provided the learners with patterns for creating

meaning, as different learning contexts triggered different knowledge frameworks ready for interpreting information (c.f. brain-based principle 4 & 10). Furthermore, very often, the learning tasks created a problem-solving context (e.g., "Teaching a Martian") so as to give a reason for learning (c.f. brain-based principle 3).

Experimental Teaching (see Section 3.2.6)

Whether or not the students could participate in class determined a great deal how well the teaching (together with the teaching materials) could truly immerse them into learning. The activities of the learning tasks were designed to be completed by the students themselves, and this would mean a lot of work on the part of the students. However, without further encouragement and help from the teacher of the team, the students could have remained unmotivated. With *teachers acting as facilitators* guiding and encouraging the student teams, the chance of having students passively sat and received information from the teachers was less possible (c.f. brain-based principle 5).

Another technique to immerse the learners into the learning tasks was *to depict the context of the learning tasks* at the very beginning of the tasks, using bilingual medium of instruction (so that it was ensured that the learners would have a good sense of direction for what would be taught in the learning tasks) (c.f. brain-based principle 4). Further, to help students engage in learning the action verbs, they would be invited to tackle a task problem (which was also one type of learning contexts), which made learning some useful action verbs necessary (c.f. brain-based principle 3), and learners' participation in the learning tasks would come more naturally.

Relaxed Alertness

As reported in Section 2.2.4.4, *relaxed alertness* is considered as a state of mind optimal for learning, which could be achieved by a delicate balance in which threat is eliminated while significant challenge for the learners is maintained. In this light, an environment that nourishes safe risk taking and active attention could be established. The "relaxing" and "alerting" environment of the BEAPs satisfied a number of brain-based learning principles (listed below). The way each (or sub-component of) technique exploited in the materials development and experimental teaching satisfied different brain-based learning principles will be explicated.

(3) The search for meaning is innate.
(5) Emotions are critical to patterning.
(7) Learning involves both focused attention and peripheral perception.
(11) Complex learning is enhanced by challenge and inhibited by threat.

Materials Development (see Section 3.2.5)

To strengthen the student-centered environment, *group-based/ collaborative learning* (c.f. Section 2.2.4.4) was constructed by the teaching materials of the programs. The 10-student group was divided into two small teams. On one hand, group work was promoted and the learners would feel "safer" to learn in a smaller group where peer-peer support was made available (c.f. brain-based principle 5 & 11); on the other hand, exciting yet benign competition was introduced to motivate learners making them more attentive to learn the action verbs, since winning a competition could be challenging, meaningful and rewarding to them (c.f. brain-based principle 3). Learning tasks facilitated inter-team competition in a "game" atmosphere, and the learners were encouraged to gain more points for their groups and to help one another out in their teams, so as to establish bonds, team spirits, and to make up for the "sometimes" inattentiveness of some group members (c.f. brain-based principle 7).

Experimental Teaching (see Section 3.2.6)

To enhance students' learning motivation, the *provision of a supportive emotional climate* was crucial. The learning atmosphere was largely controlled by the teachers. The teachers were reminded and encouraged repeatedly by the researcher to praise the students as much as they could, which should be done as genuinely and dramatically as possible. If the learners "lost" in a competition, they would not be "scolded" by the teacher, but encouraged to do better next time, (c.f. brain-based principle 5). By doing so, the learners would feel that they were important parties in the group and had made a significant contribution. In addition, the students would feel encouraged to respond to questions, since a positive teacher-student relationship was nurtured (c.f. brain-based principle 3).

There was one addition point to note in discussing the brain-based techniques used in teaching, which was the *provision of awards* (e.g., candies and stickers). These "small" presents were incredibly important as a token of appreciation to the students' hard work in their teams (c.f. brain-based principle 3). Whenever a student was brave to answer questions, the teacher would give him/ her some stickers. And, at the end of every session, the winning team (with a higher number of points gained in the learning tasks) would get some candies as a reward and the losing team would also get some "petit" candies.

Summary

To summarize, all the brain-based techniques illustrated above would eventually contribute to an *enriched learning environment* (c.f. Section 2.2.4.4), and tap into the students' different senses and emotions. The brain-based learning principles were the blueprint informing the design of the teaching materials and the method of teaching. As a result, the programs were brain-based, meaning that they were built on the

theoretical foundation of the Brain-based Learning Theory. Table 3.3 below gives a summary of the brain-based principles (c.f. Section 2.2.4.4) and the related brain-based techniques:

Table 3.3 Summary of Brain-based Techniques Exploited in Materials Development and Experimental Teaching

Brain-based principles reacted to	Techniques
Principle 1: The brain is a parallel processor.	A
Principle 3: The search for meaning is innate	A, B, C, E, F, G
Principle 4: The search for meaning occurs through patterning.	B, E
Principle 5: Emotions are critical to patterning	C, D
Principle 7: Learning involves both focused attention and peripheral perception.	C
Principle 9: We have at least two different types of memory: A spatial memory system and a set of systems for rote learning.	A
Principle 10: We understand and remember best when facts and skills are embedded in natural, spatial memory.	A, B
Principle 11: Complex learning is enhanced by challenge and inhibited by threat	C, B
Principle 12: Every brain is unique.	A

Note.
A. Task-based teaching-learning
B. Interesting and meaningful learning contexts
C. Group-based/ cooperative learning
D. Teachers acting as facilitators
E. Depicting the context of the learning tasks
F. Provision of a supportive emotional
G. Provision of awards

3.2.5 Materials Development

Concerning the teaching materials of the BEAPs, the Brain-based Learning Theory, in general, served to shape and frame the teaching materials into learning tasks (c.f. Section 3.2.4.4). The learning content, the objectives, and the activity frames (e.g., "Noughts & Crosses") of the learning tasks for both subject groups were fundamentally the same; yet, the two groups' learning tasks were constrained by their input models, and the way the learning tasks of the two groups were presented pedagogically was different. The teaching materials used by the two brain-based groups are summarized in Figure 3.2 below:

Fig 3.2 Teaching Materials Used by Action and Picture Groups

	Action Group	Picture Group
Forms to be learnt	Action verbs	Action verbs
Meanings to be shown	Physical actions	Actions shown in the pictures

The basic criterion for developing learning tasks (i.e., the teaching part and the learning activities) was that the Action Group observed and received physical "actions" as the meaning-input of the English action verbs (in the teaching part) and generated "actions" as the evidence of learning (in the learning activities), whereas the Picture Group received as meaning-input the "pictures" showing the actions (in the teaching part), and recalled the meaning of the action verbs by picture mapping (in the learning activities). The Action Group subjects would also observe actions (done by the teacher), and might think about the actions in their heads, apart from acting out the action verbs (by themselves or by imitating their teacher). The materials for the Action Group were *action verb flash cards*, having the action verb printed in the middle of the cards. The materials for the Picture Group were the *action verb picture cards* (see Appendix H), which were 2-D line drawings of "lively" characters illustrating the actions by which the subjects came to understand the meaning of the action verbs printed at the bottom part of the pictures. The characteristics of a typical learning task are summarized in Table 3.4 below:

Table 3.4 Characteristics of a Typical Learning Task

	Type	Features
Learning task	**Introduction**	• had a name • had a specific learning objective • specified with the prerequisite knowledge needed • specified with the group structure (i.e., two teams of 5 subjects, pair work, or individual work)
	Consolidation	

Each of the *learning tasks* had a name (e.g., "My Birthday party"), a specific learning objective, the prerequisite knowledge needed, and group structure,

and was designated as an *introduction* task (to introduce and teach the materials for the first time) or a *consolidation* task (to revise and further explore the materials). Also, to capture and sustain the subjects' attention, the *learning tasks* (*and activities*) were developed in consideration of the students' interests (e.g., having imaginative learning context, "Helping a Martian on earth", and role play, "In the Park"), and were devised to be accomplished by the students (with less help from the teachers).

To look at the teaching materials for each group more closely, we will take one detailed sample of the learning tasks (for *introduction* and *consolidation*) from each group for fuller illustration.

3.2.5.1 Action Group's Learning Tasks

My Dog & I would serve as a prototypical example of an introduction task, and Noughts & Crosses would be a representative example of a consolidation task.

Introduction Task (c.f. Table 3.4)

My Dog & I (task #3) was concerned with the interaction between a teacher and a stuffed dog (described as her pet at home) in an everyday-life context. The learning objectives were (i) to help subjects learn some action verbs related to pet-keeping events and (ii) to help subjects practise using action verbs through *performative* and oral means. There was no prerequisite knowledge required for this task and the grouping was 5-student teamwork (the teams had already been set up in the first learning task of the programs: e.g., Team A vs. Team B) in the first half of the activity and pair-work in the second half. In this learning task, the action verbs were *shake*, *kiss*, *slap*, *ask*, *answer*, *dance*, *feed*, *hug*, *yawn*, and *fight*.

First of all, the teacher introduced the action verbs by saying them out and performing them with a stuffed dog, while the teaching assistant showed the orthographical form of the action verbs printed on the *action verb flash cards*. Then,

the students were asked to *observe* and *imitate* what the teacher did to understand and learn the meaning of the action verbs. Then, the students were split into two 5-member teams, competing with each other. The students were required to come out one by one from the teams alternatively and draw a verb card from a bag. The student would be asked to *perform* in front of the whole group whatever action on the verb card (e.g., *hug*) with the stuffed dog. Any student who knew the action verb referred to could raise his/ her hand to answer. If the student had got the action verb correctly, a point would be awarded to the group that the student belonged to. At the end, the team with the higher number of points would win in the learning task.

To fully utilize the teaching time, there would be a second part of the activity, if the estimated time to complete the activity was shorter than the expected time (i.e., 30 minutes). So, part two of the activity was supplementary and optional, depending on the time left after the first part of the activity. Part two of the activity required the students to think of one action that they liked to do most with a dog/ pet. They had to say it out and perform it in front of their neighbors, using the stuffed dog (or with an imaginary pet). This part did not count toward the group score.

Consolidation Task (c.f. Table 3.4)

Noughts & Crosses (see Appendix C1, task #38) is a well-known children game. This learning task targeted to reinforce the action verbs learnt in the two previous learning tasks of the day, which were *stand*, *sit*, *open*, *close*, *talk*, *run*, *jump*, *come*, *squat*, *crawl*, *smile*, *laugh*, and *shake*. The grouping needed for the task was two 5-member teams of students. The teacher revised and went through the action verbs with the students by showing the action verb cards and asking them to *verbalize* and *act* the verbs out. Then, twenty-five squares were stuck on the board, with all of them numbered on one side and printed with different action verbs on the flip side. The

students of the two teams took turns to choose a square, *say* and *perform* the designated action at the back. The student could put a cross on that square, if he/ she had said the action verb and performed the action correctly. One team used noughts while another team used crosses. The target of this activity was to get a row of three noughts or crosses in any direction. The team getting more rows would win.

3.2.5.2 Picture Group's Learning Tasks

Again, "My Dog & I" would serve as a prototypical example of an introduction task, and "Noughts & Crosses" would be a representative example of a consolidation task.

Introduction Task (c.f. Table 3.4)

My Dog & I (task #5) had a similar theme and procedures as the corresponding Action Group's task #3 did, except the input model was "pictures". The pictures fell into two categories: one was the *action verb picture cards*, with line-drawing pictures illustrating the action verb on one side and the orthographical form of the action verb on the other side; the other was the pictures of the dog and its owner "performing" a specific action. The objective was to learn some action verbs related to pet-keeping events. The action verbs (i.e., the teaching content) of this learning task were the same as those of the Action Group's task #3.

First of all, the teacher introduced the action verbs with the aid of the pictures of the dog and its owner and the teaching assistant showed the action verb picture cards side by side the pictures. The students were asked to *understand* and *remember* the pictures to learn the action verbs. Then, the students were split into two 5-member teams, competing with each other. The teacher randomly drew a picture of the dog and its owner that they had seen before. One representative from each group was sent out each time, and, after seeing the picture (with a caption at the bottom of the picture, e.g., We _____ hands), they had to write down the action verb

associated with the action in the picture (e.g., *shake*) on a sheet of paper individually within five seconds. After that, they had to show their answers and a point would be awarded to the group with a correct answer. At the end, the group with higher number of points would win.

Part two of the activity would be carried out depending on the time left. This activity required pair work of the students. They would get a task sheet with a question asking them what they would like to do with their dogs and to draw a picture for that, and they would also be asked to show their pictures to their neighbors after they had finished.

Consolidation Task (c.f. Table 3.4)

Noughts & Crosses (see Appendix C2, task #20) had a similar learning objective and procedures as the corresponding Action Group's task #38 did. The teacher went through and revised the action verbs with the students by showing the action verb *picture* cards and asking them to verbalize the verbs out. Then, twenty-five squares were stuck on the board, with all of them numbered on one side and printed with different pictures of action verbs on the flip side. The students of the two teams took turns to choose a square and say the action verb associated with the picture at the back. The student could put a cross on that square, if he/ she had named the action verb the action correctly. One team used noughts while another team used crosses. The target of this activity was to get a row of 3 noughts or crosses in any direction. The team getting more rows would win.

3.2.6 Experimental Teaching

As discussed in 3.2.4.4, the brain-based learning principles were reflected in displacing the traditional "chalk and talk" and large class size by/ with learning tasks and activities, facilitated by the teachers. By doing so, the students could be well

taken care of, and the teaching was made a student-centered one. The details of the teaching conducted in the BEAPs will be presented in this section.

3.2.6.1 The Teaching Crew

To have a summary look at the teaching crew, the characteristics of the teacher and the teaching assistants are presented in Table 3.5 below:

Table 3.5 Characteristics of the Teachers

	Teacher	Teaching Assistants
Teachers' ethnicity:	1 Chinese	6 Chinese
Educational level:	Graduate student	2 graduate students 1 bachelor degree holder 2 higher diploma holder 1 undergraduate

The researcher, who served as the teacher with the help of two teaching assistants (TAs), taught both brain-based groups for the whole programs: first, the Action Group in the morning, and then the Picture Group in the afternoon. By doing so, the teacher factor could be controlled. There were a total of six TAs serving on different days of the programs, depending on their availability. They were not properly trained brain-based professionals (see Berninger & Richards, 2002: 317), but were given one training session, in which they were briefed on the way to assist in carrying out group work. Part of the learning tasks were rehearsed and tried out to ensure the practicability and implementability.

3.2.6.2 Classroom Teaching Routines

The first 30 minutes of the first session was devoted to the pre-program testing and to a brief program orientation (around 10 minutes). In the orientation, the subjects were told that they were going to learn *action verbs*, a type of vocabulary that described actions. In addition, a few expressions of the common classroom-language in English translated and written on the board were introduced to them, so as to familiarize them with the use of English.

The normal teaching in class would be like what follows: the teacher started with depicting the context of the learning task and presenting the action verbs designated for the learning task using the relevant input model (i.e., "actional" or "pictorial" input). The teacher would tell the students that they would have a competition and therefore had to grasp the meanings of the action verbs well, in order to outperform the other team. In the activity part of the task, the students were divided into small teams, and the TAs were required to facilitate the teamwork and assist those who needed more help in working out how to participate in the task. If learning was in a big group with all the subjects together, the TAs would try to lay an eye on each student to see if everyone could understand what the teacher was presenting. When finishing all the learning tasks of the day, the team which had won the highest scores would be made the Champion of the day and could choose the candies they favored, while the losing team would still get some candies given by the teacher for encouragement.

3.2.6.3 Medium of Instruction

English was at first employed as the major classroom language on the teacher's part. Yet, no sooner had the learning tasks begun, than the researcher realized that the students were hardly able to follow what she was talking about, even though she used very simple English and spoke slowly all the time. Then, the researcher had to resort to the mother tongue, Cantonese, to aid the students' listening and understanding. And, gradually, the researcher picked up the bilingual mode of giving instructions. When explaining instructions for the activities, the researcher would use Cantonese to assure that the students completely understood what she was saying. In other times, when the researcher was teaching the action verbs or giving daily classroom instructions, she would go back using English.

3.2.6.4 Attendance of the Subjects

The subjects were required to attend all ten sessions of the programs. Four could not made it for some reasons (having less than 70% of attendance), and some students turned up late. The attendance of the Picture Group was worse than that of the Action Group. When assigning subjects to teams for group work, the Picture Group always had to adjust to the number of subjects present that day, often with an uneven number of subjects in a team.

3.2.7 Data Collection

The data were gathered mainly through two means. The first one was the pre- and the post-program attainment tests and the second one was the post-program questionnaire survey. The use of these research methods will be discussed below.

3.2.7.1 Pre- and Post-program Attainment Tests

The pre- and the post-test (see Appendix D1 & D2) were conducted to assess the students' knowledge of part of the *action verbs* that appeared in the learning tasks of the programs. The pre-test results of the subjects would also generally serve as an indicator of their "level" of English proficiency in the action verb area, while the post-test results would shed light on how well the subjects of the two groups had learnt the teaching content—the *linguistic* effects of the programs.

The content of the tests was based on the action verbs covered in the programs and the format of the tests was mainly "fill-in-the-blanks" and matching. The students were required to: (1) match pictures of action with action verbs ; (2) match the names of objects with the relevant action verbs; and (3) fill in the appropriate action verbs in the sentences (this part was not counted into the total mark of the pre- and post-tests). The post-test was similar to the pre-test, except that the order of the test items was altered to avoid the ordering and memorization effect. The

total marks for each pre- and post-test were 30.

3.2.7.2 Post-program Questionnaire Survey

Due to the fact that the programs were pushed forth earlier than originally planned (c.f. Section 3.2.2), there was a lack of time to prepare a pre-program questionnaire survey for the subjects. Therefore, only one questionnaire survey was conducted at the end of the programs, which consists of items asking the subjects to indicate their *pre-* and *post*-program perception of and attitudes to English. The Chinese translation of the questionnaire items was provided alongside each item.

The questionnaire (see Appendix E) was specifically focused on the subjects' evaluation of: (1) their own language learning abilities (regarding speaking and listening), and learning attitudes (regarding their confidence level of learning English, etc.), and (2) the Brain-based English Activity Programs (regarding the knowledge they had gained, etc.). The questionnaire items were largely composed of questions of multiple-choice type, with only a few that were open-ended. The questionnaire survey required around thirty minutes to complete. The questionnaire results of (1) will be used to assess the *affective* effects of the programs.

3.2.8 Experimental Procedures

The experimental procedures were conducted and the specific details of the procedures will be explained below.

3.2.8.1 An Overview of the Experimental Procedures

Below is a summary of the experimental procedures carried out charted in Table 3.6:

Table 3.6 Summary of Experimental Procedures

Time period	Experimental Procedures
Half month before the BEAPs (Mid July – late July)	• Finalized and double-checked all the materials and learning tasks in the programs
	• Conducted training session of the teaching assistants
Day 1 of the BEAPs (Aug 4)	• Implemented the BEAPs and conducted the pre-test
Day 1-10 (Aug 4 – Aug 15)	• Taught the programs
	• Evaluated the learning tasks and the progression of students with the teaching assistants after each session
Day 10 (Aug 15)	• Conducted the post-test and the post-program questionnaire survey

3.2.8.2 Workshop for the Teaching Crew

Before the programs started, all the teaching assistants were briefed on the philosophy of the study and the framework of the BEAPs in order to guide them to understand and build up their confidence in teaching the materials. In practising out the learning tasks, the researcher demonstrated how to carry out some learning tasks to the teaching assistants, who acted as the students (or, participants of the learning tasks).

3.2.8.3 Implementation of the Programs

The BEAPs 2003 of the Action and the Picture Group were administered from August 4 to August 15 (c.f. Section 3.2.4). During that period, students did not have any other English classes in school and this safeguarded any other English inputs from the formal education. As depicted earlier in Section 3.2.4.2, the two groups were taught separately: the Action Group was taught first, followed by the Picture Group (for the daily schedule of the two groups, see Appendix F1 & F2).

3.2.8.4 Administration of the Pre- and the Post-program Test

There were some difficulties for the new school to schedule an earlier day for testing (c.f. Section 3.2.2), so the arrangement of the pre-test could not be made on time. Thus, the first 30 minutes of the first session was used for the pre-test and the orientation; likewise, the 30 minutes of the last session was taken up by the post-test. The pre- and the post-test were given to all the subjects. In order to ascertain that the two groups were similar in their prior knowledge of the action verbs (as an indicator of their English proficiency level), a t-test of significance was performed, and two subjects of the Action Group were exchanged with two Picture Group subjects, and that no significant difference was found.

3.2.8.5 Conducting Post-program Questionnaire Survey

On the last day of the programs, the questionnaire was given to all the subjects. The whole questionnaire was gone through item by item and in Cantonese with the subjects of both groups and with the TAs assisting the completion of the questionnaires in two small teams of each group.

3.3 Data Processing and Analysis

SPSS 11.5 statistical package was used to analyze the quantitative data of the pre- and the post-test as well as the questionnaire. The data of 4 subjects with less than 70% of attendance were removed from analysis. Eventually, the Action Group had 13 sets of data; the Picture Group had 11 (N=24).

"Independent-samples t-tests" were performed to compare the means of the pre-test scores, the post-test scores and the sub-sectional test scores of the Action Group and the Picture Group. "Paired-samples t-tests" were administered to perform the *within-group* comparisons of the aforesaid mean scores. Descriptive statistics consisting of numerical summary, graphical methods, etc. were employed to describe

straightforwardly what the data shows (Trochim, 2003).

3.3.1 Attainment Tests Results

This section reports the pre- and the post-test results, which provided the direct source of evaluating and comparing the *linguistic* effects of the experimental treatment on the subjects of the Action Group (A.G. hereafter) and the Picture Group (P.G. hereafter).

3.3.1.1 A General Picture of the Linguistic Effects of the BEAPs 2003

The two groups' mean scores of the two tests are summarized in Table 3.7, and a preliminary picture was obtained (for the statistical details, please refer to Appendix G1):

Table 3.7 Group Statistics of Pre- and Post-test Mean Scores

	Pre-test mean scores	Post-test mean scores	Gain	Sig. (2-tailed)
Action Group	9.08	15.54	71.15%	P=0.001
Picture Group	9.64	15.09	56.54%	P=0.001
Sig. (2-tailed)	P=0.672	P=0.829		

3.3.1.2 Inter-group Mean Scores Comparison

As is clear from Table 3.7, the A.G.'s and the P.G.'s pre-test mean score are close (around 9 marks). The P value=0.672 denotes that the two groups' pre-test performances (including the sub-sectional mean scores) reflect **no** significant difference, indicating that the two groups started off as *homogeneous* groups having similar knowledge level of action verbs.

In the post-test, the A.G.'s and the P.G.'s mean scores are, again, close. The P value=0.829 show that the two groups' post-test performances were highly similar (including the sub-sectional mean scores), which suggests that *both* groups arrived at a comparable knowledge level of action verbs.

3.3.1.3 Within-group Mean Scores Comparison

As is shown in Table 3.7, highly **significant** pre-post program differences (i.e.,

sig.=0.01) are revealed in the A.G.'s and in the P.G.'s results, which indicate that both the A.G. and the P.G. gained significantly in the learning of action verbs. This suggests that both types of treatment had highly positive linguistic effects on the subjects of the A.G. and the P.G.

Summary

Generalizing the results gathered from the independent-samples and paired-samples t-tests, a macro-picture concerning the *linguistic* effects of the programs on the two subject groups is obtained. There was a significant knowledge growth of the action verbs found in each subject group, and similar patterns of the two groups' knowledge gain were also found: not any subject group significantly outperforming the other.

3.3.2 Results of the Post-program Questionnaire Survey

"Paired-samples t-tests" were performed to show the *within-group* "pre"-post program differences in the questionnaire items concerning: (1) subjects' perceived English abilities, attitudes towards English (learning), and (2) subjects' evaluation of the programs (for statistical details, please refer to Appendix G2). Five tables have been generated to present the questionnaire results of the different aspects.

3.3.2.1 Subjects' Perceived English Abilities and Attitudes towards English (Learning)

Table 3.8 below summarizes the mean scores of the questionnaire items of the first section—subjects' perception of their English abilities and attitudes to English (learning) before and after the program:

Table 3.8 Mean Scores of Questionnaire Items (Part 1)

Questionnaire items	Group	A.G.	P.G.
Perceived English Abilities			
Volume of Speaking English	Before	2.75	2.45
	After	2.67	2.64
Listening Ability	Before	2.25	2.22
	After	2.25	2.22
Sig. (2-tailed)		**0**	**0**
Average	Before	2.50	2.34
	After	2.46	2.43
Attitudes towards English (Learning)			
Willingness in Speaking English	Before	3.69	3.55
	After	3.00	3.82
Fondness in Learning English	Before	2.33	2.73
	After	2.58	2.55
Confidence Level of Learning English	Before	2.54	2.91
	After	2.15	2.82
Sig. (2-tailed)		**0**	**1**
Average	Before	2.85	3.40
	After	2.58	3.06

Key: *Most favorable* *Least favorable*
1 2 3 4 5

Note.
1. The mean scores are highlighted if they are **significantly different** as assessed by the paired-samples t-test.

A.G.: Action Group
P.G.: Picture Group
Sig. (2-tailed): represents the number of significant differences identified by the paired-samples t-tests.
--: Not available

Table 3.8 shows that the A.G. and the P.G. subjects did **not**, in general, show major pre-post program difference in the subjects' perceived English abilities and attitudes towards learning and using English. The only significant pre-post program difference is found in the Picture Groups' *fondness in learning English*. Yet, overall speaking, the *average* post-program mean scores of the two subject groups concerning the subjects' attitudes towards learning and using English are generally lower than the pre-program ones, which suggests that the program, on the whole, had some favorable effects on the subjects' attitudes towards English (learning), which are, however, not considered as significant as the linguistic effects that the programs had (c.f. Section 3.3.1).

Table 3.9 also summarizes the results of the other questionnaire item

on the subjects' views on the English language (learning.

Table 3.9 Percentage of Subjects' Views on English

Group	Category	Positive views			Negative views		
		Interesting	Easy	Useful	Boring	Difficult	Useless
A. G.	**Before**	0.38*	0.31*	0.38*	0.15	0.31*	0.31*
	Average	**0.36**			**0.26**		
	After	0.58*	0.31*	0.38*	0.08	0.23	0.15
	Average	**0.42**			**0.15**		
P. G.	**Before**	0.27*	0.09	0.55*	0.27*	0.45*	0.27*
	Average	**0.30**			**0.33**		
	After	0.55*	0.73*	0.36*	0.09	0.09	0.18
	Average	**0.55**			**0.12**		

Note.
1. Subjects were allowed to opt more than one category.
2. The mean scores were calculated: dividing the number of subjects of that group by the number of checks of that category.
3. The bigger the mean scores are, the higher the frequency of that category being opted.
4. *: represents the top three favored categories. But, if the mean scores are the same, they are marked with the * as well.
5. The mean scores are highlighted if they are **significantly different** as assessed by the paired-samples t-test.

A.G.: Action Group
P.G.: Picture Group

Generally speaking, for the A.G., there was, after the program, an increase in the positive perception/ view on English and a corresponding decrease in the negative perception/ view on English (0.36/0.42 and 0.26/0.15). A similar pattern is found in the P.G. (0.30/0.55 and 0.33/0.12). Moreover, the Picture Group subjects showed two related significant pre-post program differences in their views towards English: they found English *easier* and *less difficult* after the program.

Summary

Generalizing the results regarding the subjects' perceived English abilities and attitudes towards English (learning) (as reported in Section 3.3.2.1), a global picture of the *affective* effects of the program on the Action Group and the Picture Group subjects is obtained (see Table 3.10 below):

Table 3.10 Summary of Affective Effects on A.G. and P.G. Subjects

	Significant pre-post program difference[2]	Positive affective effects[3]
Action Group	0	Yes
Picture Group	2	Yes

There is a positive trend for the BEAPs to produce favorable effects on *both* groups' attitudes towards learning and using English. Specifically, it was found that the A.G. and the P.G. subjects' *attitudes towards English (learning)* and *views on English* after the program were enhanced (c.f. Table 3.8 & 3.9). Furthermore, there is a significant pre-post program difference found in the Picture Group's learning attitudes concerning *fondness in learning English* (c.f. Table 3.8). In general, similar patterns of the affective effects of the programs were revealed.

[2] The number of significant differences found in the items on subjects' perceived English abilities and attitudes towards English (learning), which were identified by the paired-samples t-tests, is reported.
[3] The positive affective effects of the programs take in account the average of the mean scores of the questionnaire items on subjects' perceived English abilities and attitudes towards English (learning) as

3.3.2.2 Subjects' Evaluation of the Programs

Besides the questionnaire results of the first section, Table 3.11 below summarizes the mean scores of the subjects' evaluation of the programs (second section of the questionnaire items).

Table 3.11 Mean Scores of the Questionnaire Items (Part 2)

Group Questionnaire items	A.G.	P.G.
Evaluation of the BEAPs		
Knowledge gained from the program	1.92	3.09
Interest in Learning Action Verbs	2.50	2.20
Participation in the BEAP	2.46	2.73
Satisfaction of the Teacher and Teaching Assistants	1.67	2.20
Satisfaction of the BEAP	2.00	2.00
Average	**2.11**	**2.44**
Future Enrollment of the BEAP (1:Yes; 2: No)	1.38	1.40
Key: *Most favorable* *Least favorable* **1 2 3 4 5** 		
Note. A.G.: Action Group P.G.: Picture Group		

As is clear in Table 3.11, the *average* mean score of the five program evaluation items is 2.11 for the A.G. and 2.44 for the P.G. If we take 3 as the watershed (below 3 being on the favorable side and above 3 being on the unfavorable side), *both* the A.G. and the P.G., in general, expressed favourable evaluation of their respective brain-based programs.

Table 3.12 below further summarizes the results of the program evaluation, which are drawn from another part of the questionnaire—the subjects' like about the specific elements of the BEAPs.

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well as an item on their views on English.

Table 3.12 Percentage of Subjects' Like about Specific Elements of BEAPs

	Learning activities	Teaching content	Teaching materials	Classmates	Teaching method	Teacher and TAs	Awards	Others
A. G.	0.69*	0.08	0.08	0.31*	0.38*	0.31*	0.15	0.00
P. G.	0.55*	0.27	0.18	0.36*	0.45*	0.18	0.36*	0.00

Note.
1. Subjects were allowed to opt more than one category.
2. The mean scores were calculated: dividing the number of subjects of that group by the number of checks of that category.
3. *: represents the top three most liked categories. But, if the mean scores are the same, they are marked with the * as well.

A.G.: Action Group
P.G.: Picture Group

As is obvious from Table 3.12, the top three most liked/ favored elements for the A.G. are *learning activities*, *teaching method*, and *classmates*, which were also preferred by the P.G as the top three. Besides, the A.G. also liked their *teacher and the teaching assistants*, while the P.G. also liked the *awards*.

Still concerning the evaluation of the programs, Table 3.13 below summarizes the subjects' perceived sources of difficulties in the BEAPs:

Table 3.13 Percentage of Subjects' Perceived Source of Difficulties in the BEAPs

	Instructions of the learning activities	Teaching content	Teaching materials	Classmates	Teaching method	Teacher and TAs	No difficulties at all
A. G.	0.08	0.23*	0.31*	0.08	0.23*	0.00	0.31*
P. G.	0.18*	0.00	0.18*	0.09	0.18*	0.18*	0.36*

Note.
1. Subjects were allowed to opt more than one category.
2. The mean scores were calculated: dividing the number of subjects of that group by the number of checks of that category.
3. *: represents the top three most frequently opted categories. But, if the mean scores are the same, they are marked with the * as well.

A.G.: Action Group
P.G.: Picture Group

As can be seen from Table 3.13, the A.G. and the P.G. did **not**, in general, show major difference in their perceived source of difficulties in the programs. Except considering there are *no difficulties at all* in the programs, among the most frequently opted categories, two of them are the same for *both* subject groups, which are *teaching materials*, and *teaching method*. Moreover, as compared with the mean scores of subjects' like about the specific elements of the programs shown in Table

3.12, Table 3.13 shows relatively lower mean scores of subjects' perceived source of difficulties, which might indicate that the negative views towards the programs that the subjects expressed are fewer than the positive ones.

Summary

The general results on subjects' views on the programs, as reported in Section 3.3.2.2, suggest that *both* groups thought favorably of their respective programs; both groups showed similar patterns of evaluation of their programs. In addition, in general, the elements that the subjects liked or perceived as sources of difficulties exhibit similar patterns in the two subject groups.

3.3.3 The Research Hypotheses Tested

The null hypotheses formulated in Section 3.2.1 will be recapitulated and addressed below, and a summary of the testing results of the hypotheses is presented in Table 3.14:

Hypothesis 1 (H_0): The "actional" input will not enhance subjects' learning of English action verbs.

Hypothesis 2 (H_0): The "pictorial" input will not enhance subjects' learning of English action verbs.

Hypothesis 3 (H_0): There will be no significant difference in the *linguistic* effects on the Action and the Picture Group.

Hypothesis 4 (H_0): The Action Group subjects will not have better perception of their English abilities and attitudes towards English (learning) after the Brain-based English Activity Program.

Hypothesis 5 (H_0): The Picture Group subjects will not have better perception of their English abilities and attitudes towards English (learning) after the Brain-based English Activity Program.

Hypothesis 6 (H_0): There will be no major difference in the *affective* effects of the Programs on the Action and the Picture Group.

Table 3.14 Summary of Hypotheses-testing Results

Null Hypotheses	Construct	Instrument	Hypotheses (upheld/ rejected)
1	No A.G. within-group knowledge gain	Pre- and post-test	Rejected
2	No P.G. within-group knowledge gain	Pre- and post-test	Rejected
3	No A.G.-P.G. difference in the knowledge gain	Pre- and post-test	Upheld
4	No A.G. within-group attitudinal change	Post-program questionnaire	Partially rejected
5	No P.G. within-group attitudinal change	Post-program questionnaire	Partially rejected
6	No A.G.-P.G. difference in the attitudinal change	Post-program questionnaire	Upheld

Note.
A.G.: Action Group
P.G.: Picture Group

The first two hypotheses were rejected: the Brain-based English Activity Programs did enhance the A.G. and the P.G. subjects' learning of English action verbs. However, the third hypothesis was supported, since similar patterns of the *linguistic* effects on the A.G. and the P. G. were found. The fourth hypothesis was *partially* rejected: the A.G. subjects overall had better English learning attitudes and perception of the English language after the program; likewise, the fifth hypothesis was also *partially* rejected: the P.G. subjects overall had better English learning attitudes and perception of the English language after the program. Lastly, the sixth hypothesis was supported: similar patterns of the *affective* effects of the programs on the A.G. and the P.G. were identified.

3.4 Summary of Major Findings of the First Study

The major findings of the present study are summarized in Table 3.15 and as follows:

Table 3.15 Links of Linguistic and Affective Effects on the Two Subject Groups

Group / Type of effects	Action Group		Picture Group
Linguistic	**Yes**	=	**Yes**
Affective	Yes	=	Yes

Note.
=: represents "being equal/ similar to"
Yes: represents "significant effects"
Yes: represents "some positive effects"

1. There was a **significant**, positive effect of the Brain-based English Activity Programs on the Action and the Picture Group subjects' learning of action verbs.
2. Both the "actional" and the "pictorial" input employed in the respective Brain-based English Activity Programs **equally** helped the learners to gain significantly on the knowledge level of the action verbs.
3. The "actional" and the "pictorial" input of the respective Brain-based English Activity Programs, in general, **enhanced** the learners' attitudes towards English (learning).
4. The *affective* effects of the programs were **similar** on the Action and the Picture Group.

3.5 Discussion

This section presents a discussion of the major findings of the first study reported above. The first part of the discussion focuses on the test results related to the first three hypotheses; the second part focuses on the questionnaire results related to the other three hypotheses.

3.5.1 Impact of the BEAPs on Learners' Action Verb Learning

The interesting findings of the subjects' learning of action verbs that the A.G. and the P.G. independently achieved and made significant knowledge gain and the two input models were *equally* effective in helping the subjects learn the action verbs will first be expounded.

3.5.1.1 Significant Linguistic Enhancement of Both Subject Groups

This finding concurred with the **Total Physical Response** theory (c.f. Section 2.1.1) that a "dramatic facilitation" in learning to respond to utterances that contained action verbs was brought about by *acting* out or *observing* the actions representing the inherent messages of the utterances and the **visual** approach to teaching and learning that visual images increase learning retention and aid comprehension, which would make the pictorial input effective in helping the subjects learn the action verbs (c.f. Section 2.1.2).

3.5.1.2 Similar Patterns of the Linguistic Enhancement of the Two Subject Groups

One possible account for this finding might appeal to the **Brain-based Learning Theory** (in particular Caine & Caine's (1990) brain-based learning principle 5), which suggests that emotions are critical to the patterning of the information received, and, naturally, to learning as well. Learning involves feelings and attitudes, which can determine future learning (c.f. Section 2.2.4.4). It might be that the *similar* enhancement in *both* the A.G. and the P.G. learners' attitudes towards and perception of English (learning) has contributed to the similar patterns of enhancement in both groups' learning of action verbs. The similar patterns of the affective change in the two subject groups will be explained (see the next section).

3.5.2 Positive Effects of the BEAPs on Learners' Attitudes towards English (Learning)

Now, we will turn to the questionnaire results, which, to a certain extent, exhibited a similar pattern as the test results'. The findings that *both* the A.G. and P.G. subjects, in general, showed better attitudes towards English (learning) and more positive views on the English language after the program and the *affective* effects of the programs were similar on both subject groups will be accounted.

3.5.2.1 Positive Affective Change in Both Subject Groups

This finding concerning the positive changes in learners' attitudes towards and views on English (learning) appeals to the **Brain-based Learning Theory** which suggests all learning is experiential in some sense and it is the sense that students make of their experience as a whole (Section 2.2.4.4). So, the learners might have perceived the *English* program as a whole learning experience, with English (learning) as one of the learning experiences in the program. Then, the fact that the BEAPs could enhance the learners' perception of and attitudes towards English (learning) might be in great connection of what they thought of the programs. If the learners perceived favorably the *English* programs, which was the case, it was likely that they also perceived favorably (learning) English (c.f. Table 3.11 & 3.8)—they might have transferred the positive perception of the learning context to the perception of learning English.

In the next paragraph, in what way the learners evaluated the programs favorably, providing us with some clues to how the design of the programs might enhance the learners' affects, will be elucidated. The A.G. and the P.G. learners' evaluations of their respective programs were similar: the top three favored elements that the learners like about the programs were *learning activities*, *teaching method*, and *classmates* (c.f. Table 3.12), and, in addition, the learners' perceived difficulties in the programs were *teaching materials* and *teaching method* (c.f. 3.13).

First of all, taken together, the *learning activities* and the *teaching method* were, in the eyes of the learners, what they liked most about the BEAPs, which provided them with a good learning context and, at the same time, an *task- / activity-based* approach to teaching and learning was constructed. This approach actualized different brain-based learning principles in a number of ways (c.f. Section 3.2.4.4): in simple words, the learners' experiences with the learning activities were filled with fun elements and challenges, which were intensified through competitions purposefully carried out after the teaching part. Besides, the learning activities were developed around students' interests, having meaningful and interesting learning contexts. Seemingly contradictorily, the teaching method was also considered somewhat difficult to the learners. This might be due to the fact that the teaching method appeared new to them, and thus they had to adapt to it. They might feel a bit challenging, but at the same time they enjoyed it, which, in fact, satisfied the meaning-seeking brains that always look for challenges and novelty, and might have also particularly contributed to the positive views on English as *interesting* and *useful* (c.f. Table 3.9).

The second good point of the BEAPs was *classmates*. Alongside the task-based approach, the programs also incorporated a group-based / cooperative learning orientation, which facilitated learning through lowering the pressure and building up individual members' confidence by focusing on the team/ group work rather than on a single learner (c.f. Section 3.2.4.4). The essential "benefits" of this group-based learning approach were as the following: learners were placed in a safer learning environment, in which team members could help one another out in the learning activities; so, on one hand, they could *gradually* gain confidence and contribute more and more to the teams they belonged to, and, on the other hand, with the help from the

classmates, (learning) English was made *easier*. The learners choosing *classmates*, as the third favored element of the BEAPs, might suggest that the learners themselves acknowledged the importance of team/ group work and social interaction (Wolfe & Brandt, 1998). Indeed, getting students into groups provided a superb channel for social and academic feedback, which nurtured an emotionally encouraging atmosphere (Caine & Caine, 1990).

There might be an additional factor that attributed to the fact that the learners found English (learning) "not so difficult" (c.f. Table 3.8). That is, the strategy of proportioning the of new and the familiar action verbs to around 2 to 1 to reduce the difficulty level and to raise the familiarity level of learning the action verbs was successful (c.f. Section 3.2.4.3), which made learning challenges neither too difficult nor too easy to the learners (Diamond, & Hopson, 1998; cited in Wolfe, & Brandt, 1998).

3.5.2.2 Similar Patterns of the Affective Change in the Two Subject Groups

This finding might imply that the *type* of input (whether it is an "actional one or a "pictorial one) is not the key that will make a difference in the affective or attitudinal aspect of learning. It was reasoned that though the input models for the two subject group were different, the teaching-learning contexts for them were not, which were both brain-based ones (c.f. Section 3.2.4, 3.2.5, & 3.2.6), meaning that similar brain-based teaching-learning contexts contributed to the similar patterns of affective effects of the two subject groups. It should be reaffirmed that the only difference of the experimental design of the programs of the two subject groups lied only in the type of input. The reason for a brain-based teaching and learning framework that could bring affective changes has been put forward in the section above.

Summary

The educational findings of the "actional" and the "pictorial" input with reference to the Total Physical Response and the Visual approaches to teaching and learning have provided the grounds to explain the linguistic gain of the A.G. and the P.G. As regards why the learners of both groups like their respective programs, the task-based approach and the group-based orientation (or cooperative learning) supported by the Brain-based Learning Theory have been put forth to account for their better feelings for and the more positive attitudes towards leaning English. The similarity of the favorable *attitudes* of the two groups was attributed to the common brain-based teaching-learning context, whereas the similarity of the *linguistic* gain of the two groups is considered to be attributed by the similar affective effects on the two groups, which has been explained through the Brain-based Learning Theory that brings out the strong link between learning and emotions. However, since the finding of the similar patterns of the linguistic gain of the two subject groups contradicts the original assumption that the two input models should and would create a distinctively different picture of the linguistic enhancement, given that the cognitive processes and the related brain areas activated by these two input models were reportedly different (c.f. Section 2.2.2 & 2.2.3), a second look at the literature related to the localization of the brain functions of "action" and "picture" would be necessary.

3.5.3 A Second Look at the Literature

(Language) learning is dependent on the neural connections and performing of different brain functions (or cognitive processes) (c.f. Section 2.2.1). It was, therefore, postulated that the two input models, which caused largely different neurocognitive processing, should and would create distinctively different pictures of the linguistic enhancement. However, in Grèzes & Decety's meta-analysis (2001) (c.f. Section

2.2.2), one crucial finding seemed not to have been fully appreciated: a *functional equivalence* was proposed between the four targeted cognitive processes (i.e., action execution, action simulation, action observation and verbalization of action).

Two important clues lying behind the pictorial input of actions came to light. First, if the Picture Group subjects imagined the actions mentally and/or had an intention to execute the actions they perceived and encoded in the *action verb picture cards*, the brain regions activated to the mental simulation of action and/or all other different neurocognitive processes of action would be triggered, due to the functional equivalence between the cognitive processes. Second, more importantly, it seems that the Picture Group subjects would have inevitably thought about the actions during picture encoding when they were looking at the pictures of *actions*, and, at the same time, processing as well as reading out the actions verbs (as the Action Group subjects were), which made it more spontaneous for them to simulate or act out the actions, as the verbs were "calling for" actions. Through reviewing the literature, *action verb processing* (Pullvermüller *et al.*, 2001) caused differential activation along the motor strip and *verbalization of action* (Grèzes & Decety, 2001) would activate a number of brain areas (e.g., ventral premotor cortex, Broca area, middle temporal gyrus, etc.), some of which were, in fact, in common with those activated by *action processing* (i.e., the cognitive processes triggered by "actions"). These two clues could serve as a speculative and tentative account for the similar patterns of the linguistic outcomes in the A.G. and the P.G. subjects.

Now, it seems that the similarity of the two subject groups' results begins to make sense. The original working assumption that the "actional" and the "pictorial" input would trigger different cognitive processes was insufficiently informed especially when the localization of the brain functions was concerned only with the

non-linguistic inputs (i.e., the "actional" and the "pictorial" input). So, the new understanding of the two teaching models would be "actions" in action verb processing and "pictures" in action verb processing, and our modified view now is that the "pictorial" *teaching input* would activate the cognitive processes similar (if not totally identical) to those activated by the "actional" *teaching input*. Interestingly enough, actions can be represented with verbal *symbols* (a kind of visuals), i.e., "actional" commands (Wileman, 1993); the human body (in terms of gesture, facial expressions, and body movements) is also one type of standard *visual aids* (Cheek & Beeman, 1991), which could serve as another angle to support the commonality in the "actional" and the "pictorial" input.

Putting the inspirations above together, a new picture of the "actional" and the "pictorial" *teaching input* in relation to the source and the type of stimulus in the teaching inputs has emerged, as shown in Table 3.16 below:

Table 3.16 Summary of Stimuli in the Teaching Input

Subject group / Source of stimulus	**Action Group**	**Picture Group**
"Actions"	"actional", "visual"	--
"Pictures" (of actions)	--	"visual", "actional"
"Action verb"	"visual[4]", "actional"	"visual", "actional"

Note.
--: represents the absence of the source of stimuli

The query concerning the similarity of the linguistic enhancement brought about by the two input models had begun to be resolved, yet with a second study under a better research condition, the results would come more reliable and convincing. As a result, though not originally planned, in order to solicit a clearer and cleaner picture of how the "actional" and the "pictorial" input would be *similar* (as was newly postulated) on the FL learning of English action verbs, the second study

[4] The subjects would read the action verbs from the action verb cards.

was conducted; its details will be explicated in Chapter Four. And, before moving on to explore more closely the educational outcomes of this common neuro-cognitive base in the second study, the evaluation of study one will first be conducted (see next section).

3.5.4 Evaluation of the First Study

Although the subjects perceived the programs favorably, strictly speaking, there would still be room for improvement in the areas of design and implementation process, which was mainly due to the constraints on the present study as reported earlier.

1. Abrupt Change of School (c.f. Section 3.2.2): resulted in a lack of time in preparing a pre-program questionnaire survey, and the subjects might have been confused in considering the pre- and the post-program state of English language learning.
2. Lack of Opportunity in Arranging the Pre-program Testing (c.f. Section 3.2.8): might have had some minor effects on the perceptions of the input models of four subjects who had been rearranged to the other group after the first session of the programs.
3. Lack of Other Qualitative Research Methods (c.f. Section 3.2.7): might have led to insufficient triangulation of the data.
4. Practice Effect of the Teacher (c.f. Section 3.2.6): might have benefited the P.G. subjects, because the teacher was teaching the P.G. using the same teaching materials (with a different input model) the second time.
5. Changing Medium of Instruction (c.f. Section 3.2.6): might have been confusing to the students, which, in turn, affected students' learning.
6. Unsatisfactory Attendance of some Subjects (c.f. Section 3.2.6): resulted in the

data of four subjects being eliminated from analysis—the A.G. had 13 pieces of data; the P.G. had 11 (N=24). The small number of subjects (esp. of the P.G.) lessened the reliability and validity of the findings drawn from the results of the subjects of its group.

7. Inconstant Teaching Crew (c.f. Section 3.2.6): might have induced necessary adaptation of different TAs' teaching styles on the part of the subjects, which might have influenced their learning in some way, since familiarity is important in a brain-based learning environment (c.f. Section 2.2.4.4).
8. Lack of Recess (c.f. Section 3.2.4.1): might have affected the subjects' opportunities to "absorb" what they had learnt.

The inadequacies of the first study were disclosed. Yet, to what extent these might have influenced the pedagogical outcomes of the experimental treatment remains skeptical. So, the second study was carefully conducted to remove the inadequacies reviewed.

3.6 Methods to Improve the Study Design and Implementation

In light of setting up the second study, the corresponding means of improvement are suggested. There are also some additional points to take note of when designing and executing study two, which would then better the experimental condition. The ways of improvement will be listed in point form below for easy reference:

1. Building a rapport with the participating school: by conducting a workshop for the teaching crew early and keeping close contact with the school administration before and during the study.
2. Pre-program testing: should be arranged well before the programs start in order to obtain the results and allocate the students into different subject groups.

3. Questionnaire survey: should include both the *pre-* and the *post-* program questionnaire forms so as to make both pre-post program distinction clear for the subjects.
4. Qualitative research methods (e.g., post-program interview): should be incorporated in order to triangulate the data obtained.
5. The sequence of teaching different brain-based groups: should be alternatively switched to avoid the practice effect of teaching. Another possible way could be having different teachers teaching different subject groups at the same time (but, the teaching styles have to be monitored).
6. Medium of instruction: should be standardized to be a bilingual mode from the beginning till the end, with a trend of diffusing more and more English into the programs whenever and wherever.
7. The teaching crew: must be a stable force so as to establish familiarity and acquaintance with the subjects.
8. A break for recess: should be provided, so that there would be time for the brains of the subjects to internalize knowledge newly absorbed.
9. The time for each learning task: could be prolonged to forty-five minutes, adopting the usual classroom teaching time frame, so that the objectives of the learning tasks could be fully achieved, and the subjects could learn in a more relaxing atmosphere.
10. Attendance of the subjects: should be closely monitored (e.g., contact the absentees at the first opportunity, so that the subjects and their results could be maximally used).
11. Insertion of the third, combined teaching model of the "actional" and the "pictorial" input: could serve to "double-check" whether the two input modalities

would have the same learning effects on action verb learning.

3.7 Summary of Chapter 3

Chapter Three essentially describes the design, the instrumentation, the data collection procedures, the results analysis and discussion of the *first* study.

First, the subject selection criteria were laid out through which the subjects were recruited and an impression on their general English proficiency level was captured. Since the study adopted an experimental research design, an outline of the variables of the study was provided.

Second, the experimental treatment in terms of the design of the Brain-based English Activity Programs 2003, the set-up of the subject groups, the teaching content of the programs as well as the brain-based techniques exploited were described. The materials development was reported and specific introduction and consolidation learning tasks were illustrated. The experimental teaching were also depicted, which illustrates *brain-based teaching-learning* in the use of the aforesaid techniques.

Next, following a summary description of the experimental procedures, the construction of the instruments was described: the pre- and the post-program attainment test and the post-program questionnaire.

Finally, the data analysis was performed and the results presented. The findings of the study were explained through the Total Physical Response and the Visual Approach to teaching and learning, and the Brain-based Learning Theory. The evaluation of the first study was carried out through reviewing the study design and the implementation process. Some inadequacies of the first study were brought to light, providing directions to construct a better design and implementation process of the second study.

Chapter 4

THE SECOND STUDY

4.1 Introduction

The modifications in the design and the implementation process for the second study have already been discussed in Chapter 3. To provide an informed answer for how *similar* or different the pedagogical effects of the two brain-based teaching input models would have on learning English action verbs, a follow-up second study was carefully planned and administered. Additional reasons for carrying out this second study were: first, to see if the results might be different with a different sample group who had a higher English proficiency level, a different time frame, and, above all, in a modified experimental condition; second, to investigate the applicability of the learning tasks of the programs to the primary school's regular curriculum.

In this chapter, the second study of the Brain-based English Activity Programs 2004 will be reported, from revised research methodology to the analysis of the results. Details additional to those of the first study, regarding the methodology, will be reported. The findings and an evaluation of the second study will be presented. Basically, the structure of Chapter 4 is similar to that of Chapter 3. However, a discussion comparing the findings of the two studies will be presented in the Chapter 5.

4.1.1 Comparison of the First Study and the Second Study

In order to present the link between the first study and the second study, an overview of the different aspects of the two studies, concerning the research design, is tabulated below:

Table 4.1 Comparison of First and Second Study

Study 1	Study 2
Theoretical Framework	
"Brain-based": "**Actions**" and "**Pictures**"	"Brain-based": "**Actions**", "**Pictures**" and "**Actions and Pictures**"
Aims	
• To investigate how *different* the two input models in the BEAPs which focused on action verb learning would be • To offer suggestions for teachers who wish to teach English (action verbs)	• To investigate how *similar* the three input models in the BEAPs which focused on action verb learning would be • To offer suggestions for teachers who wish to teach English (action verbs)
Subjects	
Local primary three students	Same as the left
Lower intermediate English proficiency level	Intermediate English proficiency level
Number: 28 (M: 21; F: 7)	Number: 30 (M: 15; F: 15)
Number of Subject Groups	
2 (14 students/ group)	3(10 students/ group)
Action Group	Action Group
Picture Group	Picture Group
--	*Combined* (Action + Picture) Group
Teaching -Learning "Context"	
English language programs Brain-based (grounded on brain-based learning principles): • Task-based: learning tasks as lessons • Group-based: cooperative learning	Same as the left
Teaching "Content"	
69 action verbs ("learnt": 43; new: 26)	77 action verbs ("learnt": 41; new: 36)
Teaching Crew	
One teacher (for two groups)	Two co-teachers (for each group)
2 teaching assistants	A "mobile" teaching assistant
Methods of Data Collection	
1. Pre- and post-test	1. Same as the left
2. Post- program questionnaire survey of the subjects	2. Pre- and post- program questionnaire surveys of the subjects
--	3. Post- program questionnaire survey of the teachers
--	4. Post-program oral interview of the subjects
Actual Teaching Time	
14 hours (1.5 hours/ session)	16 hours (2 hours/ session)
Duration	
2 successive weeks (10 days)	8 Saturdays (spreading over 3 months)
Results	

Pre-test mean score	Post-test mean score	Pre-test mean score	Post-test mean score
9.08	15.54	18.90	32.33
9.64	15.09	19.50	32.10
--	--	18.90	33.90
Both action group and picture group equally **improved significantly**		**All** three groups **improved significantly** on the same scale	

4.2 Design of the Second Study

The framework of the research design did not deviate from that of the first study (c.f. Section 3.2), meaning that the second study adopted an experimental design and the same theoretical framework of the first study. However, because of the modification of the neurocognitive processes involved in the "pictorial" input model coming from the first study, one of the aims of the second study was different from that of the first study: to investigate how *similar* the "actional", the "pictorial", and the "combined" input models in the Brain-based English Activity Programs would be.

4.2.1 Research Hypotheses

Due to the insertion of a third, combined teaching model (see Section 3.6 for the rationale) and to a new understanding and interpretation of the teaching models and findings concerning the similarity of the linguistic effects on the two subject groups in the first study, the research questions and some of the corresponding null hypotheses were extended and amended. Eight specific, null hypotheses addressing the more group-specific information about the learning outcomes of the programs on the subjects of the Action Group, the Picture Group, and the Combined Group are listed below the research questions.

4.2.1.1 Research Questions

1. Will such Brain-based English Activity Programs bring enhancement to subjects' learning of English action verbs?
2. Will the **"actional", "pictorial",** or **"combined"** input models bring *similar* enhancement to subjects' learning of English action verbs, model of input?
3. Will such Brain-based English Activity Programs pose positive effects on the subjects' perceived English abilities and attitudes towards English (learning)?
4. Will the **"actional", "pictorial",** or **"combined"** input models bring *similar* enhancement to the subjects' perceived English abilities and attitudes towards English (learning)?

4.2.1.2 Null Hypotheses

Hypothesis 1 (H_0): The "actional" input will not enhance subjects' learning of English action verbs.

Hypothesis 2 (H_0): The "pictorial" input will not enhance subjects' learning of English action verbs.

Hypothesis 3 (H_0): The "combined" input will not enhance subjects' learning of English action verbs.

Hypothesis 4 (H_0): There **will be** a significant difference in the *linguistic* effects on the Action, the Picture, and the Combined Group.

Hypothesis 5 (H_0): The Action Group subjects will not have better perception of their English abilities and attitudes towards English (learning) after the Brain-based English Activity Program.

Hypothesis 6 (H_0): The Picture Group subjects will not have better perception of their English abilities and attitudes towards English (learning) after the Brain-based English Activity Program.

Hypothesis 7 (H_0): The Picture Group subjects will not have better perception of their English abilities and attitudes towards English (learning) after the Brain-based English Activity Program.

Hypothesis 8 (H_0): There **will be** a major difference in the *affective* effects of the programs on the Action, the Picture, and the Combined Group.

4.2.2 Subjects

Before going into details, the characteristics of the subjects are briefly summarized in Table 4.2 below:

Table 4.2 Characteristics of the Subjects

Subjects' background:	Chinese learners of English as a foreign language in Hong Kong, China
Educational level:	Primary/ Grade Three
Number of subjects:	30 (15 males and 15 females)
English proficiency level:	Intermediate

Thirty Primary/ Grade three students from a primary school participated in the study. The subjects went through the same selection process as those of the first study (c.f. 3.2.2). They were first randomized into three groups (n= 10) and then some

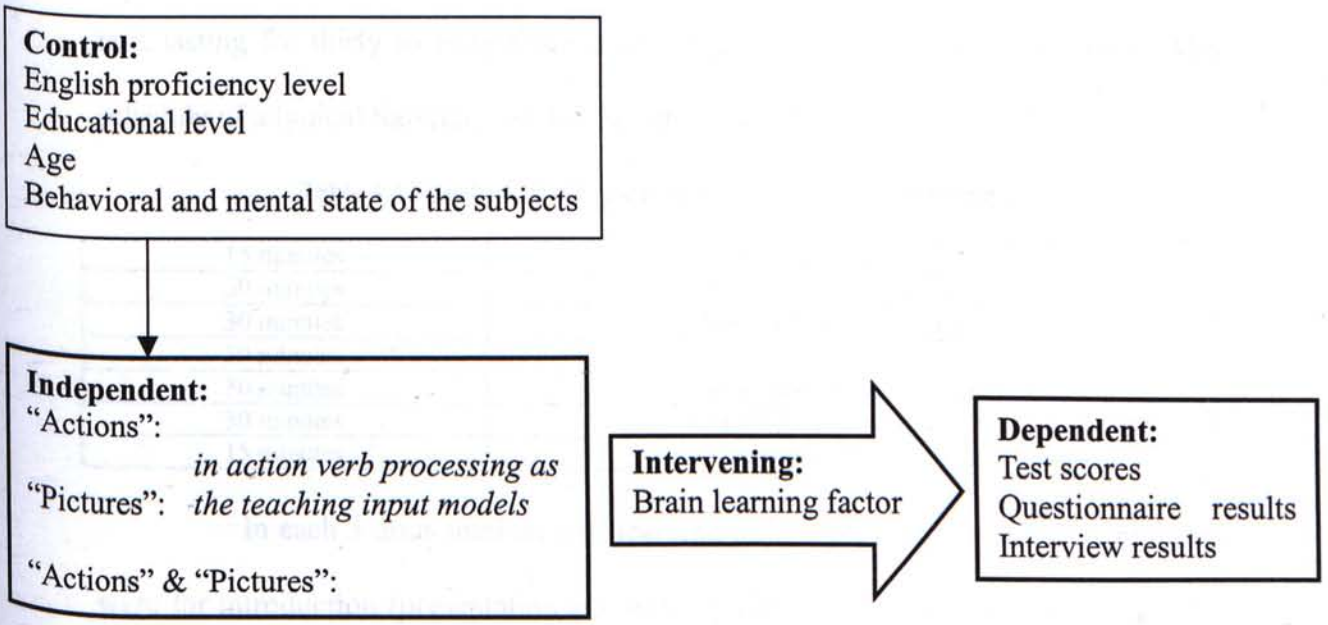
subjects were re-allocated into other groups, so that three groups of the subjects were matched on their average results of a pre-test which served as a measure of their prior knowledge of the teaching content of the programs and an indicator of their English proficiency level. The mean scores for the three groups were respectively 19.20, 19.50 and 18.90.

Their English teachers commented that the English proficiency level of this group of subjects was average. This could also be reflected by their pre-test mean score, which were 19.33 out of 36.00. At the beginning of the programs, the subjects could respond to some routine classroom language in English.

4.2.3 Variables of the Second Study

To give an overview of the research design, the variables of the second study are shown below:

Fig 4.1 Variables of the Second Study



The variables of the second study continued with those of the first study (c.f. Section 3.2.3), but with a few added to the independent and the dependent variables. The *independent variables* are "actions", "pictures" and "actions and

pictures" in **action verb processing** as the *teaching* input models that would respectively influence the *dependent variables*—the subjects' test scores of the post-program attainment test, results of the post-program questionnaire surveys, and the post-program oral interview. The *intervening variable* and the *control variables* are the same as those of the first study.

4.2.4 Experimental Treatment

The experimental treatment was situated in a time frame in different from that of the first study, which was eight Saturday sessions stretching over three months.

4.2.4.1 Design of the Programs

The BEAPs 2004 ran from January 3 to March 13. The aim of the programs and the task-based and group-based approaches that the programs adopted were the same as the first study (c.f. Section 3.2.4.1). *Thirty-two* learning tasks were designed for each subject group (most of which were adopted from those of the first study), with each task lasting for thirty to forty-five minutes (up to the control of the teachers). The schedule of a typical Saturday teaching program would be like Table 4.3:

Table 4.3 Schedule of a Typical Session for All Subject Groups

15 minutes	Classroom administration
30 minutes	Introduction learning task 1
30 minutes	Introduction learning task 2
30 minutes	Break
30 minutes	Consolidation learning task 1
30 minutes	Consolidation learning task 2
15 minutes	Classroom administration

In each 3-hour session, four learning tasks were administered: the first two were for introduction (presentation and initial practice) of the teaching materials; the last two were for consolidation (revision and subsequent practice) of the materials, with a 30-minute recess. Other than the recess, fifteen minutes were spared for classroom administration (e.g., having roll call) both before and after each session. However, since a learning task could, sometimes, be stretched over thirty minutes, the

recess or the fifteen-minute time slot towards the end could be flexibly used.

4.2.4.2 Brain-based Groups

Table 4.4 below summarizes the different brain-based groups in accordance with their teaching input models and the related stimuli received in the BEAPs 2004:

Table 4.4 Subject Groups and the Corresponding Type of Stimuli in the Second Study

Subject Group	Teaching Input model	Type of stimuli
1: A. G.	"Actions"	"actional", "visual"
2: P. G.	"Pictures"	"visual", "actional"
3: C. G.	"Actions & Pictures"	Same as above

Note.
A. G.: Action Group
P. G.: Picture Group
C. G.: Combined Group

There were *three* brain-based subject groups, with the first two groups adhering the input models of the first study, while the third group combined and utilized the input models of the first two groups, which were "actions" and "pictures", and the stimulation of both teaching input models was balanced through the design of the learning tasks for the Combined Group (see Section 4.2.5). It was reasoned that the three groups of subjects would be stimulated in *similar* brain areas (for the brain regions activated by the stimuli, see Appendix A2 & A3; and also Section 3.5.3).

The three brain-based groups were assigned to three different classes, which were taught simultaneously. Each subject group consisted of ten students, with a balanced male-female ratio, and two small teams of five.

4.2.4.3 Teaching Content

The teaching content was 77 *action verbs* (see Appendix I1), which made the programs more focal. The three brain-based groups would learn the *same* set of action verbs. In view of the English proficiency level of the subjects, which was higher than those of the first study, the difficulty level of the teaching content was adjusted. There were 36 new than 41 familiar action verbs (the new words are in bold as shown in

Appendix I1). The distribution of action verbs in the learning tasks was made (see Appendix I2); each action verb would appear at least *four* times in the BEAPs (e.g., *sit*, *stand*); the more difficult ones would appear even as many as *twelve* times (e.g., *shake*).

4.2.4.4 Brain-based Techniques Exploited in Materials Development and Teaching

Apart from the brain-based techniques illustrated in Chapter 3 (c.f. Section 3.2.4.4), which were similarly exploited in the design of the BEAPs 2004, a technique newly introduced in the second study, which was *ample rest* (c.f. Table 4.3), will be reported: a sufficient break was provided, and the subjects were allowed to bring their snacks and water. They could do some "snacking" to replenish energy and rejuvenate in a 30-minute break (c.f. brain-based principle 2 & 7).

4.2.5 Materials Development

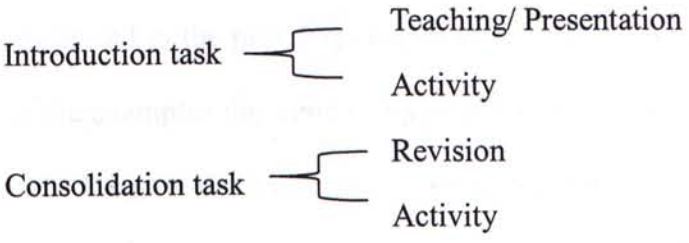
The teaching materials of the three brain-based groups constrained by their input models are shown in Figure 4.2 below:

Fig 4.2 Teaching Materials Used by Action, Picture, and Combined Groups

	Action Group	**Picture Group**	**Combined Group**
Forms to be learnt	Action verbs	Action verbs	Action verbs
Meanings to be shown	Physical actions	Actions shown in pictures	Physical actions & actions shown in pictures

The teaching-learning tasks/ materials (see Appendix J1, J2, & J3) were developed on the brain-based framework employed in the first study and the characteristics of the learning tasks remained the same in the second study (c.f. Section 3.2.4.4). Yet, the structure of a learning task was made more explicit to the teachers. The components of the introduction and consolidation task are exemplified below:

Fig 4.3 Components of Introduction and Consolidation Tasks



The introduction task was composed of a *teaching/ presentation* component of the teaching content (i.e., action verbs) and an *activity* component in a form of a competition between two small teams in a big group in which the students were to revise and put what they had just learnt into practice. The consolidation task consisted of a *revision* of the teaching content covered in two former introduction tasks and an *activity* component in which the students were to further solidify their knowledge of the learnt action verbs.

The learning tasks for each subject group were constrained by the independent variables of the study. The Action Group (A.G.) and the Picture Group (P.G.) were strictly forbidden to diffuse into the each other so that a clear picture could be produced regarding the input-model- specific effects. The materials for the A.G. were *action verb flash cards*, having the action verb printed in the middle of the cards. The materials for the P.G. were the *action verb picture cards* (see Appendix Q), which were 2-D line drawings of "lively" characters illustrating the actions by which the subjects came to understand the meaning of the action verbs printed on the flip side of the pictures. The Combined Group (C.G.) would take both input models, with a balanced "actional" and "pictorial" stimulation. That is, in the *teaching* component, the C.G. subjects learnt the action verbs through the meaning input of both pictures of actions and physical actions; in the *activity* component, the C.G. subjects practised and acquired the action verb knowledge either through picture mapping or through generating "actions" as the evidence of learning.

As the teaching materials for the Action and the Picture Group have been explicated in the previous chapter (c.f. Section 3.2.5.1 & 3.2.5.2), we will again take as the examples the same *introduction* task, *My Dog & I*, and the same *consolidation* task, *Noughts & Crosses*, to illustrate the learning tasks of the Combined Group. By and large, the learning tasks of the Combined Group incorporated the *teaching/ revision* component of the Picture Group and the *activity* component of the Action Group (see also Fig 4.3).

4.2.5.1 Introduction Task of the Combined Group

My Dog & I (task #18) had the same learning objective and grouping as the Action Group's learning task did. And, this group used both the pictures of the dog and its owner and the action verb picture cards as the Picture Group did.

It started with the *teaching/ presentation* part: the teacher taught the action verbs with the aid of the pictures of the dog and its owner and the teaching assistant showed an action verb picture cards side by side the pictures. The students were asked to *understand* and *remember* the pictures of the actions as well as *imitate* the action of the *pictures* to learn the action verbs. Part one and two of the activity part were the same as the Action Group. That is, in part one, the representatives of the teams had to act out the action verb on the card and others who knew the action verb acted out could raise their hands to answer; in part two, the students could act out their favorite actions with their pets.

4.2.5.2 Consolidation Task of the Combined Group

Noughts & Crosses (see Appendix J3, task #3) of the Combined Group had similar learning objective and procedures as the Action Group's and the Picture Group's learning task did, only that in the revision part the teacher went through the action verbs with the students by showing them action verb *picture* cards and asking them to

both verbalize and act the verbs out. And, the activity part was divided into two rounds. In the first round, the set of squares printed with *action verbs* on the flip side was used; in the second round, the set of squares printed with *pictures* of action verbs was used.

4.2.6 Experimental Teaching

As discussed in Section 3.2.4.4, the brain-based learning principles helped to determine the "brain-based" way the teachers conducted teaching. Due to a better support from the school, each brain-based group was served by a teaching crew composed of two co-teachers and a "mobile" teaching assistant (who provided technical support); the basic framework of teaching was *interactive teaching*. One teacher was responsible for the *teaching/ presentation* part of the learning task, and the other teacher would be responsible for the *activity* part. While one teacher was teaching, the other would serve as an assistant teacher (AT), helping to show flash cards, for instance. The "mobile" teaching assistant would give technical support to the teachers. The teachers and the assistant teachers' teaching background and their role in the programs will be described below.

4.2.6.1 The Teaching Crew

To have a summary look at the teaching crew, the characteristics of the teachers are presented in Table 4.6 below:

Table 4.5 Characteristics of the Teachers

	School Teachers	CUHK students
Teachers' ethnicity:	4 Chinese	3 Chinese
Educational level:	4 got teacher's certificate	2 graduate students 1 undergraduate student

Four teachers were recruited from the school who were willing to offer help in the programs. There were three other teachers recruited from the English Department of the Chinese University of Hong Kong (CUHK), who also expressed their willingness to take up the role as teachers of the BEAPs.

With reference to the teachers' assignments, the pedagogical settings were considered. The Combined Group demanded more complex pedagogical co-ordination between the "actional" and the "pictorial" input. Thus, the teacher with the strongest teaching background (who had served as a teacher in a similar Project two years ago, c.f. Chapter 1) together with an undergraduate student, who had some formal teaching experience were assigned to handle the Combined Group. Two other teachers were randomly paired with two graduate students and were assigned to the A.G. and the P.G. respectively. A school teacher who was an intern, served as a "mobile" teaching assistant helping whichever group in need.

4.2.6.2 Teaching Role

The role of the teachers (Ts) and the assistant teachers (ATs) were explained in the workshops (training sessions) in two occasions as follows:

Table 4.6 Role of the Teachers and the Assistant Teachers

The Role of the Teachers
• Have full understanding of the teaching materials and good preparation for teaching the learning tasks
• Have a short meeting with the assistant teacher before the day begins
• *Teach* all the designated action verbs and make sure that the students have grasped the teaching content
• Build up a competition atmosphere and ignite the fun element of the learning tasks
• Lead a small team when the group splits and ensure that students understand the instructions and teaching content
• Work closely with the assistant teacher
• Evaluate all tasks and the teaching with the assistant teacher and the active observer at the end of each session, with a view to improve teaching in the following week
The Role of the Assistant Teachers
• Have full understanding of the teaching materials and good preparation for carry out the activity in a small group
• Have a short meeting with the other teacher before the programs begin
• Arrange students to queue up and have the roll call in the playground
• Help prepare and allocate teaching materials (e.g., showing action verb flash cards)
• Conduct the *activity* part of the learning task.
• Lead a small team when the groups splits and ensure that students understand the instructions and teaching content
• Build up team spirit and help ignite the fun element of the learning tasks
• Keep time for each learning task (and remind the co-teacher)
• Evaluate all tasks with the teacher and the active observer at the end of each session so as to improve teaching in the following week

The teachers and the assistant teachers as well as their teaching styles were closely monitored by an active observer (the researcher herself), so that the three subject groups would closely observe the three input models and be nurtured in a similar brain-based teaching-learning environment. Having fully understood their roles, the teachers taught the students with a set of teaching routines, which will be described below.

4.2.6.3 Classroom Teaching Routines

At the beginning of the very first session, the teacher of each group told the students that they were going to learn action verbs that describe actions. In the subsequent

regular sessions, a roll call was made at the beginning. The researcher would call the subjects who did not turn up to check if they were on the way or would be absent that day. If the subjects were found staying at home, they would be strongly encouraged to come and not to miss class that day.

In each typical regular session, the presentation/ revision part (of the introduction/ consolidation task) was conducted in a big group with all ten subjects learning together. The *teacher*, apart from telling the subjects that they were going to have inter-team competitions, first explained the context of the learning task (e.g., the subjects were going to learn a dance). Then, the teachers started to teach the designated action verbs and ensured that the subjects had learnt them well enough to move on to the activity part. When the subjects appeared ready, the *assistant teacher* would begin the activity part by dividing them into two small teams and demonstrate how to "play" the game (activity). Most of the time, the activities would require *group work*. The co-teachers had to lead a small team independently, facilitate the teamwork, encourage team members to participate actively, and give actual help to those who needed more help to work out how to participate in the task. The presentation/ revision part took up around fifteen minutes, and the rest was used for the activity part.

The first two learning tasks were introduction tasks and the last two were consolidation tasks with a 30-minute recess in between provided. The introduction tasks not only served to teach the action verbs, but also created a platform for teachers to evaluate their students how well the students had learnt the materials. Then, in the revision part of the consolidation tasks, the teacher could adjust to the students' previous performance in the introduction tasks and selectively emphasized and revised the action verbs that the students had not grasped well. To provide some on-

the-spot encouragement, candies were awarded to the Champion Team of the day, while the losing team would still get some candies given by the teacher for consolation and encouragement.

4.2.6.4 Medium of Instruction

The language used to teach and deliver instructions were standardized in the BEAPs 2004. When the teachers were teaching (or, presenting) the action verbs, *English* was highly recommended as the medium of instruction, since these were the programs for teaching English. Despite the English orientation, *bilingual* medium of instruction was adopted at the beginning of the learning task/ activity, so as to make sure that subjects knew what was going on and how they could participate. However, any translation of the teaching materials (i.e., action verbs) was *strictly* disapproved, since it was against the research design assumption that the use of different input models would contribute to the understanding of the teaching materials. In this light, in the activity part, the demonstration of how to play the activity was suggested.

4.2.6.5 Attendance of the Subjects

The subjects were required to attend all eight sessions of the programs, but there was one student in the Action Group who, for some reasons, had less than 70% of attendance, and some students, like in the normal school days, showed up late.

Summary

The details of the experiential teaching were reported. As far as the brain-based learning principles were concerned (c.f. Section 2.2.4.4 & 3.2.4.4), Table 4.7 below summarizes a couple of things as presented above that the teachers were required to attend to; they were generalized as brain-based teaching tips and were given to the teaching crew in the training sessions:

Table 4.7 General Guide for Brain-based Experimental Teaching

	Explaining	Revising	Teaching Tips
Action Group	by actional, verbal hints	by *verb* flash cards	**NO:** • Translation of action verbs **YES:** • Explanation of instructions & demonstration • A supportive emotional climate • Group work • Challenge Vs. Threat • "Breaks"/ time to internalize the knowledge learnt
Picture Group	by verbal hints	by *picture* cards	
Combined Group	by actional, verbal hints	by *picture* cards	

4.2.7 Data Collection

The data were collected primarily via these instruments: (1) a pre- and a post-program attainment test, (2) a pre- and a post-program questionnaire survey of the subjects, (3) a post-program questionnaire survey of the teachers, and (4) a post-program oral interview of the subjects. Additionally, the programs were selectively videotaped and the oral interviews were audiotaped for future reference. The aim of each instrument will be explained in details as follows:

4.2.7.1 Pre- and Post-program Attainment Tests

The aim of the pre- and the post-test (see Appendix K1 & K2) was similar to that of the first study (c.f. Section 3.2.7)—to investigate the *linguistic* effects of the programs. The content of the tests was based on what was covered in the programs and there were two parts of the test. Part One was the test on the recognition of pictures of actions (which were different from the *action verb picture cards* that appeared in BEAPs); Part Two was the test on the recognition of actions performed by the researcher. The format of Part One was "fill-in-the-blanks" with choices of answer provided over the pictures, and Part Two was in the format of "multiple-choice". The total marks for each pre- and post-test were 30.00.

4.2.7.2 Pre- and Post-program Questionnaire Surveys

There were two types of questionnaire in the second study: one was for the subjects

and the other was for the teachers.

The pre- and the post-program questionnaire of the subjects were largely the same, except the last question (see Appendix L1 & L2). The structure of the subjects' questionnaire of the second study was slightly different from that of the first study: (1) subjects' perceived language learning ability regarding *speaking* and *listening*, (2) learning attitudes, (3) learners' preferences and hindrances in learning English, and (4) reactions to the BEAPs (the third section was newly added). The function of the questionnaire survey was similar to that of the first study: to investigate the *affective* effects of the programs on the subjects, which would be largely reflected by the results of the first two sections of the questionnaire. The time for each questionnaire survey was shorten to twenty minutes.

Other than the questionnaire survey of the subjects, there was also a questionnaire survey of the teachers (see Appendix M1), with a view to elicit teachers' observation of how the students' learning attitudes, participation, and conduct might change in the course of doing the learning tasks. Besides, the teachers' own reactions to the BEAPs and brain-based teaching as well as their views on the possibility of incorporating the learning tasks of the programs into the regular curriculum were also explored. Hence, the teachers' questionnaire consisted of five questions that were open-ended. It was stated clearly that the questionnaire was not designed for the sake of evaluation of the teachers, but for collecting teachers' opinions only. The teachers' comments were typed on the questionnaire by themselves (see Appendix M2). The summary of the type of the questionnaire surveys conducted is shown in Table 4.8 below:

Table 4.8 Summary of Questionnaire Surveys Conducted

Target	Type of Questionnaire Survey
Subjects	Pre- and post- programme questionnaire surveys
Teachers	Post- programme questionnaire survey

4.2.7.3 Post- program Subjects' Oral Interview

A semi-structured, individual subjects' post-program interview was conducted in the mother tongue. Each interview case was audiotaped for future reference. This instrument consisted of two parts and served two functions. One was the interview of six sampled subjects, with two from each subject group. The interview collaborated with the subjects' questionnaire in a way that all the pre-determined questions of the interview in fact appeared also in the pre- and the post-program questionnaire. Consequently, the focus of the interview was on the subjects' perception of English (learning) and reactions to the programs, but this time more in-depth and individually-based. The interview contained seven specific core questions set beforehand (see Appendix N1) and some other questions were asked according to how the subjects answered the questions. Also, since the results of the post-program questionnaire had been earlier collected, the researcher could actually ask for the reason why the subjects had thought in the way they had done. The individual interviews were transcribed into English (see Appendix N2). Second, the interview focused on whether the Picture Group subjects would simulate the actions shown in the pictures mentally and/or perform the actions (not under the instruction of the teachers). So, all the Picture Group subjects were interviewed individually, with two main questions being asked (see also Appendix N1).

4.2.8 Experimental Procedures

The experimental procedures were meticulously conducted to ensure the validity of the second study, and the specific details of the procedures will be explained below.

4.2.8.1 An Overview of the Experimental Procedures

The summary of the experimental procedures carried out is charted in the Table 4.9:

Table 4.9 Summary of Experimental Procedures

Time period	Experimental Procedures
A month before the BEAPs (Early Dec – Early Jan)	• Finalized and double-checked all the materials and the learning tasks in the programs
	• Conducted a workshop for the first lot of teachers (Dec 11) and the second lot of teachers (Jan 1)
	• Conducted the pre-test and the questionnaire survey and administered an orientation session to the subjects (Dec 13)
Session 1-8 (Jan 3 – March 13)	• Taught the programs
	• Evaluated the learning tasks and the progression of the students with the teaching assistants after each session
Session 8 (March 13)	• Conducted the post-test and the post-program questionnaire survey
2 days after the BEAPs	• Administered a post-program interview for the subjects
5 days after the BEAPs	• Sent a questionnaire to every teacher
After mid March	• Started analyzing the data obtained

A month before the BEAPs was implemented, a workshop was held for the teachers of the school. For the assistant teachers recruited from the Chinese University of Hong Kong, they also received training before the implementation of the programs with the same set of materials.

Half month before the BEAPs started, an orientation session for the subjects was administered. In that session, the pre-program testing and questionnaire survey were first conducted; then some familiarization of learning activities (not appearing in the BEAPs) was carried out by the teachers. The BEAPs were implemented two weeks after the orientation.

After each Saturday session, all the teaching staff together with the active observer (i.e., the researcher) held an evaluation of the learning tasks conducted that day. At the end of the programs, after a 10-minute break, the subjects were asked to sit for the post-program test and fill out a post-program questionnaire survey. Moreover, two days after the programs, the interview of the subjects was conducted individually

by the researcher. Finally, five days after the programs, the teachers were also asked to fill out a written questionnaire, which contained questions asking for their views on certain issues about the BEAPs.

4.2.8.2 Workshop for the Teaching Crew

Like BEAPs of the first study, all the teaching staff was briefed on the philosophy of the study and the framework of the programs in order to guide them to understand and build up their confidence in teaching the materials. The brain-based teaching tips (c.f. Section 4.2.6) were offered to them as a basic guideline for their teaching. In addition, the researcher demonstrated how to carry out a learning task to the school teachers, acting as students (or, participants of the learning task). Nonetheless, since the assistant teachers recruited from the University who were required to carry out the *activity* part of the learning tasks were appointed later, they had a separate training session from those school teachers. In their training session, they were asked to demonstrate individually how well they could administer a learning task, while others acted as the students, and the researcher gave each assistant teacher some comments according to her performance.

4.2.8.3 Orientation for the Subjects

An orientation session was specifically devised and administered to the subjects of the second study. Besides familiarizing the subjects with the brain-based teaching and learning environment, which stressed students' devotion, group-work and enjoyment, it also provided the teaching crew (those teachers of the school) a chance to practise conducting some learning activities (which were not about action verbs). Moreover, the common classroom language in English was taught.

4.2.8.4 Administration of the Pre-program Attainment Test and Questionnaire

The pre-program test and questionnaire were given to all the subjects on the same day

of the orientation. They were administered before having any learning activities, so that the subjects would be more focused and "serious" in answering the test and the questionnaire items.

4.2.8.5 Implementation of the Programs

The BEAPs 2004 of the Action, the Picture, and the Combined Group ran from January 3 to March 13, consisting 8 Saturday sessions (c.f. Section 4.2.4.1). As depicted earlier, the three brain-based groups proceeded simultaneously, following the same schedule (see Section 4.2.4.2). After each session, all the teaching staff gathered together and evaluated the implementation of the learning tasks with the active observer. Also, the learning tasks for the coming Saturday were briefed to them.

4.2.8.6 Conducting the Post- program Subjects' Oral Interview

The first and the second part of the post-program interview (c.f. Section 4.2.7.3) were administered two days after the programs, in a relaxing atmosphere in a room of the researcher with the subject only. The subjects as told by the researcher expressed their views freely on their learning abilities, learning attitudes, and the programs. Each interview generally lasted for ten minutes.

4.2.8.7 Administration of the Post-program Attainment Test and Questionnaire

The post-program test and questionnaire were given to all the subjects on the last day of the programs. After a 10-minutes break, they were administered, and the subjects were reminded to answer all the test and questionnaire items seriously. As regards the questionnaire for the teachers, it was given to them 5 days after the BEAPs.

4.3 Data Processing and Analysis

This section reports on the analysis on the data of the attainment tests and questionnaire survey using **SPSS 11.5** statistical package. In addition, simple descriptive and inferential statistics were employed to interpret the data collected,

including those of the interviews. In this case, the data coming from 3 sources made a triangulation of the data possible. The data of 1 subject was removed from analysis due to his unsatisfactory attendance (i.e., less than 70%). The Action Group had 9 pieces of data; the Picture Group had 10; the Combined Group also had 10 (N=29). The format of analyses and the structure of this section was basically in line with that of the first study (c.f. Section 3.3).

4.3.1 Attainment Tests Results

The pre- and the post-test results are one of the most direct sources of evaluating the *linguistic* effects of the experimental treatment on the subjects of the Action Group (A.G. hereafter), the Picture Group (P.G. hereafter), and the Combined Group (C.G. hereafter). Thus, we will first analyze these results and obtain a preliminary picture.

4.3.1.1 A General Picture of the Linguistics Effect of the BEAPs 2004

The three groups' mean scores of the pre- and post-test are summarized in the Table 4.10 (for the statistical details, please refer to Appendix P1):

Table 4.10 Summary of Group-specific Pre- and Post-test Mean Scores

	Pre-test mean scores	Post-test mean scores	Gain	Sig. (2-tailed)
A. G.	18.90	32.33	71.06 %	P=0.001
P. G.	19.50	32.10	64.62 %	P=0.001
C. G.	18.90	33.90	79.37 %	P=0.001
Sig. (2-tailed)	P=0.701 (A.G.-P.G.) P=0.704 (P.G.-C.G.) P=0. 995 (A.G.-C.G.)	P=0. 923 (A.G.-P.G.) P=0. 247 (P.G.-C.G.) P=0. 452 (A.G.-C.G.)		

Note.
A.G.: Action Group
P.G.: Picture Group
C.G.: Combined Group

4.3.1.2 Inter-group Mean Scores Comparison

As is obvious from Table 4.10, the A.G.'s, P.G.'s, and C.G.'s mean score are close (around 19 marks). The three sets of P value = 0.701, 0.704, and 0. 995 denote that the three groups' pre-test performances (including the sub-sectional mean scores)

reflect **no** significant differences (i.e., sig.>0.05), indicating that the three groups started off as *homogeneous* groups having similar knowledge level of action verbs.

In the post-test, the three groups' mean scores are, again, close. The P value = 0.923, 0.247, 0.452 show that there are **no** significant differences (i.e., sig.>0.05) in the three groups' post-test performances (including the sub-sectional mean scores), which suggests that *all* three groups arrived at a comparable knowledge level of action verbs.

4.3.1.3 Within-group Mean Scores Comparison

As is shown in Table 4.10, highly **significant** differences (i.e., sig.=0.01) are illuminated in A.G.'s, the P.G.'s, and the C.G.'s results. And, it would be posited that the subjects of the three groups, internally, had significantly gained knowledge of action verbs in the BEAPs, meaning that the three types of treatment had highly positive linguistic effects on the subjects.

Summary

The results gathered from the independent-samples and paired-samples t-tests are useful for determining the *linguistic* effect of the programs on the A.G., the P.G., and the C.G. That is, a growth of the knowledge level of the action verbs was found in *all* the three subject groups, while there is no significant difference found in the three groups' knowledge gains of the action verbs, without having one group significantly outperforming the others.

4.3.2 Results of the Questionnaire Surveys

This section reports the results of the two types of questionnaire. First, the results of the pre- and the post-program questionnaire survey of the subjects will be presented; second, the results of the questionnaire survey of the teachers will also be reported.

4.3.2.1 Subjects' Questionnaire Results

"Paired-samples t-tests" were performed to show the *within-group* "pre"-post program differences in the questionnaire items concerning subjects' *own* evaluation on a several aspects of learning English as a foreign language before and after the BEAP: (1) their perceived English language learning abilities, regarding *speaking* and *listening*, (2) learning attitudes, (3) learning preferences and hindrances in learning, and (4) reactions to the BEAPs (for the statistical details, please refer to Appendix L1 & L2). Five tables were generated to present the summarized pre- and the post-program questionnaire results of the different aspects.

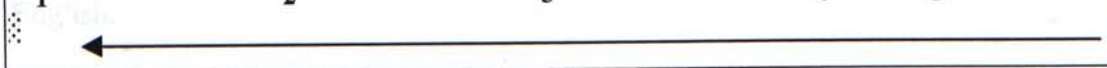
Subjects' Perceived English Abilities and Attitudes towards English (Learning)

Table 4.11 below summarizes the mean scores of the pre- and the post-program questionnaire of the first and second section—subjects' perceived English abilities, and subjects' attitudes towards English (learning):

Table 4.11 Pre- and Post-program Questionnaire Results (Part 1 & 2)

Questionnaire items	Group	A.G.	P.G.	C.G.
Perceived English Abilities				
Volume of Speaking English	Before	2.67	2.60	2.70
	After	2.33	2.50	2.70
Listening Ability	Before	2.33	2.30	3.30
	After	2.22	2.00	2.10
Sig. (2-tailed)		**0**	**0**	**1**
Average	Before	2.50	2.45	3.00
	After	2.28	2.25	2.40
Attitudes towards English (Learning)				
Willingness in Speaking English	Before	2.44	2.30	2.70
	After	2.44	2.20	2.40
Fondness in Learning English	Before	1.78	1.90	2.90
	After	1.78	1.90	2.50
Confidence Level of Learning English	Before	2.22	2.30	2.60
	After	2.11	2.30	2.60
Active Participation in the English Lessons	Before	2.22	2.70	3.20
	In	2.33	1.70	1.90
Sig. (2-tailed)		**0**	**1**	**1**
Average	Before	2.17	2.30	2.85
	After	2.17	2.03	2.35

Key: *Most favorable* *Least favorable*
1 **2** **3** **4** **5**



Note.
1. The questionnaire items are concerned with subjects' perceptions of the various aspects of English (learning) before, after, or in the BEAPs (c.f. Section 4.2.7).
2. The data are highlighted if they are significantly different as assessed by the paired-samples t-test.

A.G.: Action Group
P.G.: Picture Group
C.G.: Combined Group
Sig. (2-tailed): represents the number of significant differences identified by the paired-samples t-tests.
--: Not available

As is obvious from Table 4.11, the A.G. and the P.G. subjects did **not**, in general, show major pre-post program difference in the perception of their English abilities and attitudes towards learning and using English. No significant pre-post-program difference is found in the A.G., while in the P.G., the only difference is in the subjects' *active participation in the English lessons*. In the C.G., there are two significant differences respectively found in the subjects' *listening ability*, and *active participation in the English lessons*. Yet, overall speaking, the *average* post-program mean scores of the three subject groups concerning the subjects' perceived English

abilities and attitudes towards learning English are generally lower than the pre-program ones (except there was no pre-post program difference found in the average mean scores of the A.G.'s attitudes towards English learning). This might indicate that the program generally had some favorable affective effects on the subjects' attitudes towards English (learning), with the effects on the C.G. the most positive and salient.

Moreover, before the program, the C.G.'s average mean score is the highest among the three subject groups (i.e., 3.00 & 2.85), suggesting that the subjects of the C.G. had the worst perception of their English abilities and of learning English. However, after the program, the three subject groups' mean scores become closer, which again suggests that the C.G. subjects showed a more significant pre-post program difference in their perception of their English abilities and of learning English.

Other than the table above, Table 4.12 below also summarizes the results of the other questionnaire item on the subjects' attitudes towards English (learning)—the subjects' views on the English language before and after the program:

Table 4.12 Percentage of Subjects' Views on English

Group	Category	Positive comments			Negative comments		
		Interesting	Easy	Useful	Boring	Difficult	Useless
A. G.	**Before**	0.78*	0.44*	0.78*	--	0.22	--
	Average		**0.67**			**0.07**	
	After	0.89*	0.22*	0.67*	--	0.11	0.11
	Average		**0.59**			**0.07**	
P. G.	**Before**	0.80*	0.30	0.70*	0.10	0.40*	--
	Average		**0.60**			**0.16**	
	After	0.90*	0.40*	0.50*	0.10	0.10	--
	Average		**0.60**			**0.06**	
C. G.	**Before**	0.70*	--	0.80*	0.10	0.60*	0.10
	Average		**0.50**			**0.26**	
	After	0.90*	0.30*	0.70*	--	--	--
	Average		**0.70**			**0.00**	

Note.
1. Subjects were allowed to opt more than one category.
2. The mean scores were calculated: dividing the number of subjects of that group by the number of checks of that category.
3. The bigger the mean scores are, the higher the frequency of that category being opted.
4. --: represents that no subject opted that category.
5. *: represents the top three favored categories. But, if the mean scores are the same, they are marked with the * as well.
6. The mean scores are highlighted if they are **significantly different** as assessed by the paired-samples t-test.

A.G.: Action Group
P.G.: Picture Group
C.G.: Combined Group

As is shown in Table 4.12, both the A.G. and the P.G. subjects did **not** show any major pre-post program differences in their views on English, whereas the C.G. subjects showed two related significant pre-post program differences in their views towards English: they found English *easier* and *less difficult* after the program. Overall speaking, both the *average* pre- and post-program mean scores of the positive and negative views are showing great contrasts (i.e., the ratio is low) for both the A.G. and the P.G, which suggests that the pre-post program difference is minimal. But, for the C.G., the ratio of the positive and the negative views is not as low as that of the two other groups before the program, and is sharply decreased after the program (0.50/ 0.26 and 0.70/ 0.00).

Summary

By generalizing the results as regards the subjects' perceived English abilities and attitudes towards English (learning) (reported in Section I), the *affective* effects of the programs on the A.G., the P.G., and the C.G. subjects can be determined (see Table 4.13 below):

Table 4.13 Summary of Affective Effects on A.G., P.G., and C.G. Subjects

	Significant pre-post program differences[1]	**Positive affective effects**[2]
Action Group	0	Some
Picture Group	1	Some
Combined Group	2	Yes

In general, the BEAPs produced some favorable affective effects on *all* subject groups, yet the most positive and overt in the C.G. A significant difference is found in the P.G.'s *active participation in the English lessons*, and in the C.G.'s *listening ability*, *active participation in the English lessons*, and *views on the English Language*. It was discovered that, on the whole, the C.G.'s subjects had the greatest change of affect.

Learners' Preferences and Hindrances to Learning

Table 4.14 below summarizes the results of the subjects' learning preferences before and after the program:

[1] The number of significant differences found in the items on subjects' perceived English abilities and attitudes towards English (learning), which were identified by the paired-samples t-tests, is reported.
[2] The positive affective effects of the programs take into account the average of the mean scores of the questionnaire items on subjects' perceived English abilities and attitudes towards English (learning) as

Table 4.14 Pre- and Post-program Questionnaire Results (Part 3a)

Questionnaire items \ Group		A.G.	P.G.	C.G.
What Subjects Like when Learning English				
Has many activities/ games	Before	0.78	1.00	0.90
	After	0.78*	0.80*	0.70*
Has interesting teaching content	Before	0.33	0.60	0.50
	After	0.33	0.60*	0.50
Can look at pictures/ real objects	Before	0.44	0.40	0.50
	After	0.11	0.50	0.50
Can listen to teacher/ other students speaking English	Before	0.22	0.10	0.40
	After	0.11	0.40	0.40
Can speak English	Before	0.44	0.50	0.20
	After	0.44	0.50	0.30
Can learn in small groups	Before	0.33	0.40	0.40
	After	0.78*	0.60*	0.90*
Has good teacher and assistant teachers	Before	0.33	0.10	0.40
	After	0.11	0.20	0.40
Has awards (e.g., candies and stickers)	Before	0.11	0.70	0.40
	After	0.00	0.10	0.50
Others	Before	0.00	0.10	0.10
	After	0.00	0.00	0.20
Sig. (2-tailed)		**0**	**1**	**1**

Note.
1. Subjects were allowed to opt more than one category.
2. The mean scores were calculated: dividing the number of subjects of that group by the number of checks of that category.
3. The bigger the mean scores are, the higher the frequency of that category being opted.
4. *: represents the two highest post-program mean scores of the categories in the subject group. But, if the mean scores are the same, they are marked with the * as well.
5. The mean scores are highlighted if they are **significantly different** as assessed by the paired-samples t-test.
6. Others: represents "other preferred means to learn English".

A.G.: Action Group
P.G.: Picture Group
C.G.: Combined Group

As can be seen from Table 4.14, all the A.G., the P.G., and the C.G. subjects did **not**, in general, show major pre-post program difference in their preferences concerning the studied aspects of learning. One significant pre-post program difference is found in the P.G.'s *has awards*, and in the C.G.s' *can learn in small groups*. For the P.G., the post-program mean score of *has awards* is significant lower than the pre-program one, meaning that the P.G. subjects perceived that they were *less* fond of awards, but might be fonder of the other aspects of learning English. For the C.G., the subjects perceived that they were *fonder* of being able to learn in

well as an item on their views on English.

small groups. In addition, the top two most liked/ favored elements of learning English after the programs are *can have many activities/ games* and *can learn in small groups*, which are the same across the three subject groups.

To add to above, Table 4.15 below also summarizes the results of the evaluation of the programs, which are drawn from another questionnaire item—the subjects' perceived hindrances in learning English before and *in* the programs:

Table 4.15 Pre- and Post-program Questionnaire Results (Part 3b)

Questionnaire items / Group		A.G.	P.G.	C.G.
Perceived Hindrances in learning English				
In lack of activities/ games	Before	0.44	0.50	0.70
	In	0.25	0.11	0.33
Has boring teaching content	Before	0.11	0.40	0.30
	In	0.00	0.00	0.11
Lack of teaching aids	Before	0.44	0.10	0.50
	In	0.13	0.11	0.22
No chance to teacher/ other students speaking English	Before	0.22	0.00	0.00
	In	0.00	0.00	0.11
No chance to speak English	Before	0.33	0.10	0.20
	In	0.00	0.00	0.11
No chance to learn in small groups	Before	0.22	0.30	0.40
	In	0.13	0.00	0.22
Teacher and assistant teachers	Before	0.00	0.10	0.10
	In	0.00	0.00	0.22
In lack of awards (e.g., candies and stickers)	Before	0.11	0.50	0.60
	In	0.13	0.11	0.22
No hindrances at all	Before	0.00	0.00	0.20
	In	1.13	1.56	1.44
Sig. (2-tailed)		**1**	**1**	**1**
Average	Before	0.23	0.25	0.35
	In	0.08	0.04	0.19

Note.
1. Subjects were allowed to opt more than one category.
2. The mean scores were calculated: dividing the number of subjects of that group by the number of checks of that category.
3. Average: represents the average mean scores of the first eight categories of source of difficulties without taking the last category, *no hindrances at all*, into account.
4. The bigger the mean scores are, the higher the frequency of that category being opted.
5. The mean scores are highlighted if they are **significantly different** as assessed by the paired-samples t-test.

A.G.: Action Group
P.G.: Picture Group
C.G.: Combined Group

It is clear from Table 4.15 that the A.G., the P.G., and the C.G., in general, did **not** show major pre-in program difference in their perceived hindrances to learning, but one pre-in program significant difference was found consistently in all

the three subject groups, which is in *no hindrances at all*. These results suggest that, on the whole, the subjects perceived that the hindrances in learning were significantly reduced in the program, which correlates with the average in-program mean scores of the three subject groups that are sharply lower than the pre-program ones.

Summary

By generalizing the results reported in Section II, the subjects' preferences and perceived hindrances in learning English can be seen. That is, no significant pre-post program difference was found in the A.G., P.G., and the C.G.'s learning preferences, and the top two most liked/ favored elements of learning English after the programs are *can have many activities/ games* and *can learn in small groups*, which are the same across the three subject groups. A significant pre-post program difference was found in the A.G., P.G., and the C.G.'s perceived hindrances.

Reaction to the BEAPs

Table 4.16 summarizes the results of the pre- and the post-program questionnaire of the last section:

Table 4.16 Pre- and Post-program Questionnaire Results (Part 4)

Questionnaire items \ Group	A.G.	P.G.	C.G.
Reaction to the BEAPs			
Future Participation of the BEAPs	1.10	1.10	1.30

Note.
1. 1: represents "yes" ; 2: represents "no"
2. The mean scores are highlighted and *italicized* if they are significantly different as assessed by the independent-samples t-test.

A.G.: Action Group
P.G.: Picture Group
C.G.: Combined Group

As is reflected from Table 4.16, the A.G.'s, the P.G.'s, and the C. G.'s mean score is around 1, suggesting the proportion of the subjects who would join the program in the future if given the chance is large. And, the three subject groups did **not** show significant difference in their future enrollment of the program.

Summary

The results reported in Section III, concerning the evaluation of the programs with reference to the future enrollment of the program, indicate that *all* three groups thought of their respective programs favorably, since most of them would join the program in the future if given the chance.

4.3.2.2 Teachers' Questionnaire Results

From the teachers' perspectives and observation, we can understand the students' reactions to the learning tasks/ the programs better, and the teaching staff's own views on the BEAPs and brain-based teaching, and their views of incorporating the learning tasks of the programs into the regular curriculum will also be reported. The teachers' comments were categorized into three domains, positive, neutral, and negative, which reflect the nature of the comments.

Students' Reactions to the Learning Tasks

I. Subjects' Participation in Class

The group-specific comments regarding subjects' participation in class in the initial lessons and towards the end of the program are charted in Table 4.17 and 4.18 below:

Table 4.17 Teachers' Comments on Subjects' Participation in Class in Initial Lessons

Comments \ Group	A.G.	P.G.	C.G.
Positive & Neutral Comments			
--	--	--	--
Total	**0**	**0**	**0**
Negative Comments			
The students did not understand the rules of the activities very well.	V	--	--
The students did not learn the action verbs fast enough to play the games.	--	V	--
The students did not pay attention.	--	V	--
Total	**1**	**2**	**0**

Note:
1. The comments were made by the teachers of the respective groups.
2. (2)V: indicates the group to which the commentator(s) belonged.
A.G.: Action Group
P.G.: Picture Group
C.G.: Combined Group

Table 4.18 Teachers' Comments on Subjects' Participation in Class towards the End of Programs

Comments \ Group	A.G.	P.G.	C.G.
Positive Comments			
The students were more involved in the learning tasks.	V	--	--
Great improvements in the students' participation in class.	--	V	--
The students participated more actively.	V	V	V
Some students who were rather passive became more active.	--	V	V
Some learning activities were particularly exciting to the students, which made the students more involved in learning.	--	--	V
The students learnt the action verb better so that the learning activities were more enjoyable than before.	--	V	--
There were more responses from the students.	--	--	V
The students paid more attention in the class.	--	V	V
The students understood the rules of the activities better.	--	--	V
Total	**2**	**5**	**6**
Neutral Comments			
If the content of the materials/ games was interesting, the students' participation would increase, as the learning task proceeded.	--	V	--
Total	**0**	**1**	**0**
Negative Comments			
The students' participation might be affected, if there were some other activities before the session of the program began, or they had not have lunch before coming to class.	--	V	--
Some students might not pay full attention, because some activities were not as interesting as those in the beginning.	--	V	--
Total	**0**	**2**	**0**

Note: Same as those of Table 4.17.

As is clear from Table 4.17and 4.18, the number of positive comments of both the P.G. and the C.G. concerning subjects' participation in class showed great beginning-end program difference (the Picture Group: from 0 to 5; the Combined Group: from 0 to 6). On the other hand, the number of negative comments for the three groups, in general, does not show obvious changes.

II. Subjects' Learning Attitudes

The group-specific comments regarding subjects' learning attitudes in the initial lessons and towards the end of the program are charted in Table 4.19 and 4.20 below:

Table 4.19 Teachers' Comments on Subjects' Learning Attitudes in Initial Lessons

Comments \ Group	A.G.	P.G.	C.G.
Positive Comments			
The program seemed quite fresh to them.	V	--	--
The students seemed quite/ very interested in the program.	V	--	V
The students appeared quite happy moving their bodies.	V	--	V
The students were positive.	V	--	--
The students seemed very excited about the games.	--	V	--
Most students adapted to the activities quite well.	--	--	V
The students were happy to speak out the verbs.	--	--	V
The students were curious about the program.	--	--	V
The students were willing to learn.	--	--	V
Total	**4**	**1**	**6**
Neutral Comments			
--	--	--	--
Total	**0**	**0**	**0**
Negative Comments			
The students were not very enthusiastic about the program.	V	V	--
Total	**1**	**1**	**0**

Note: Same as those of Table 4.17.

Table 4.20 Teachers' Comments on Subjects' Learning Attitudes towards the End of Programs

Comments \ Group	A.G.	P.G.	C.G.
Positive Comments			
The students were much more interested in the vocabulary learning.	V	--	--
The students were much more interested in the learning activities than in the beginning of the program.	V	--	--
The students were very eager to get marks for their teams.	V	--	--
The students were positive.	--	2V	--
The students, generally, enjoyed playing the activities.	V	V	V
The students enjoyed the competition very much.	--	--	V
The students were excited about the activities to come.	V	--	--
The students felt happy to learn and play.	V	--	--
The students were willing to answer questions (in English).	V	--	V
The students were willing/ eager to learn (action verbs).	V	V	V
The satisfaction for the students was greater, as they could get most of the answers correct.	--	V	--
Even if the students appeared a bit bored at the teaching part, they all tried to follow the teacher.	--	--	V
The students were very confident in speaking English.	--	--	V
Total	**8**	**5**	**6**
Neutral Comments			
Not any noticeable change from the beginning of the program.	--	2V	--
Total	**1**	**2**	**0**
Negative Comments			
The students seemed a bit bored by the activities that had similar patterns.	V	--	--
The students seemed a bit bored by the repeated action practice in the revision part.	2V	--	--
Total	**3**	**0**	**0**

Note: Same as those of Table 4.17.

As is shown from Table 4.19 and 4.20, both the A.G. and the P.G. had shown an increase of four positive comments concerning subjects' learning attitudes (the A.G.: from 4 to 8; the P.G.: from 1 to 5), while there are two neutral comments from the teachers of the P.G. remarking that there were no noticeable changes in subjects' learning activities. For the C.G., the number of the positive comments, at the beginning and in the end of the program, are the same. On the other hand, the number of negative comments for the three groups, in general, does not show obvious changes.

III. Subjects' Conducts

The group-specific comments regarding subjects' conducts in the initial lessons and towards the end of the program are charted in Table 4.21 and 4.22 below:

Table 4.21 Teachers' Comments on Subjects' Conducts in Initial Lessons

Comments \ Group	A.G.	P.G.	C.G.
Positive, Neutral, and Negative Comments			
--	--	--	--
Total	**0**	**0**	**0**

Note: Same as those of Table 4.17.

Table 4.22 Teachers' Comments on Subjects' Conducts towards the End of Programs

Comments \ Group	A.G.	P.G.	C.G.
Positive Comments			
The students' behaviors were good.	V	--	--
The students' conducts were better, because of the better control of the teachers.	--	V	--
The students' conducts improved.	--	--	V
Total	**1**	**1**	**1**
Neutral Comments			
No big change from the beginning of the program.	V	--	--
Total	**1**	**0**	**0**
Negative Comments			
--	--	--	--
Total	**0**	**0**	**0**

Note: Same as those of Table 4.17.

Table 4.21 and 4.22 show that there were not many comments made on subjects' conducts, and all the A.G., the P.G., and the C.G. did not show great

beginning-end program difference in the number of the positive or negative comments they got.

IV. Subjects' Interaction with other Students

The group-specific comments regarding subjects' interaction with other students in the initial lessons and towards the end of the program are charted in Table 4.23 and 4.24 below:

Table 4.23 Teachers' Comments on Subjects' Interaction with Others in Initial Lessons

Comments \ Group	A.G.	P.G.	C.G.
Positive & Neutral Comments			
--	--	--	--
Total	**0**	**0**	**0**
Negative Comments			
The students did not willing to discuss with classmates.	--	V	--
The team spirit was not well developed.	--	V	--
The students' within-group cooperation was not very good, and thus there was some "chaos" during group work.	--	V	--
The students of the different teams quarreled.	--	V	--
The students competed with one another to be the one who took charge within their teams.	--	V	--
Total	**0**	**5**	**0**

Note: Same as those of Table 4.17.

Table 4.24 Teachers' Comments on Subjects' Interaction with Others towards the End of Programs

Comments \ Group	A.G.	P.G.	C.G.
Positive Comments			
The students co-operated with the team members more.	V		V
Communication among the students increased.	V		V
More interaction among the members from the same group.	V		
The students cooperated better with their group members by talking and encouraging the more brilliant students to be the representatives to answer the questions.		V	
There was some improvement in the students' interaction.		V	
The students' interaction improved.			V
Total	**3**	**2**	**3**
Neutral Comments			
--	--	--	--
Total	**0**	**0**	**0**
Negative Comments			
--	--	--	--
Total	**0**	**0**	**0**

Note: Same as those of Table 4.17.

As is obvious from Table 4.23 and 4.24, all the A.G., the P.G., and the C.G. had shown an increase of positive comments concerning students' interaction with the others The negative comments of the P.G. are highly decreased.

Summary

Table 4.25 below summarizes the number of the total positive and negative comments of the three subject groups:

Table 4.25 Summary of the Number of Positive and Negative Comments

Comments \ Group		A.G.	P.G.	C.G.
Positive Comments	Beginning	4	1	6
	End	14	13	16
Negative Comments	Beginning	2	8	0
	End	2	2	0

All the A.G., the P.G., and the C.G. showed a similar, huge rise of positive comments, while the P.G. had the biggest decrease of negative comments.

Teachers' Reactions to the Programs

I. Teachers' Perceived Gains from the BEAPs

The group-specific comments regarding the teachers' own views on the programs are charted in Table 4.26 below:

Table 4.26 Teachers' Perceived Gains from the Programs

Comments \ Group	A.G.	P.G.	C.G.
Because of the "Brain-based Teaching Method"			
Knew a new kind of teaching method.	V	--	V
Knew more English learning activities.	V	--	--
Games can increase students' motivation.	V	--	--
Teaching words using action can be interesting and useful in the classroom.	V	--	--
Students' emotions are very important to their learning.	--	V	--
The BEAP made me more aware of the potentials of our brains.	--	V	--
The traditional teaching method is not the only way to make us learn.	--	V	--
Sub-total		8	
Because of the "Brain-based" Teaching Strategies			
Different techniques can be employed to stimulate our brains in order we can learn better.	--	V	--
I learnt a number of new teaching strategies through the program.	--	V	--
I have learnt not to talk too fast and always try to slow down.	--	--	V
I have learnt to give simple commands and instructions in English.	--	--	V
I have learnt how to control the class when the students were too noisy.	--	--	V
Teaching students of different ages have to use different approaches.	V	--	--
I have learnt to settle disputes that occurred during the learning activities.	--	--	V
I have learnt to divide students into groups, and how to separate the students who were always talking.	--	--	V
Sub-total		8	
Others			
I will apply more activities to my teaching.	--	--	V
Sub-total		1	
Total of each subject group	5	5	7
Total of all groups		17	

Note:
1. The comments were made by the teachers of the respective groups.
2. (2)V: indicates the group to which the commentator(s) belonged.

A.G.: Action Group
P.G.: Picture Group
C.G.: Combined Group

As is shown from Table 4.26, the teachers' perceived gains mainly came from the brain-based teaching method and the brain-based teaching strategies, which were new to them. The total number of the comments of the three subject groups is close.

II. Teachers' Perceived Enjoyments in Brain-based Teaching

The group-specific comments regarding the teachers' perceived enjoyments in brain-based teaching are charted in Table 4.27 below:

Table 4.27 Teachers' Perceived Enjoyments in Brain-based Teaching

Comments \ Group	A.G.	P.G.	C.G.
Because of the Students			
The students in my group were good, and they were benefited from the program. So, the satisfaction was quite good.	V	--	--
The students enjoyed the program, and so did I.	V	V	V
The students had improvements in the program.	V	--	--
I liked my students.	--	V	--
I liked interacting with the students.	--	--	V
Sub-total	7		
Because of the Learning Activities			
The learning activities were quite/ very interesting.	V	V	V
It was fun to teach the students using so many activities.	--	--	V
Sub-total	4		
Others			
I learnt a lot from both the teachers and the students.	--	--	V
I did enjoy the teaching experience.	--	V	--
It provided me with an actual teaching experience.	--	V	--
Sub-total	3		
Total of each subject group	4	5	5
Total of all groups	14		

Note: Same as those of Table 4.26.

As is clear from Table 4.27, the teachers' perceived enjoyments in the brain-based teaching were mainly contributed by the students. Paying a closer look at the specific comments, we can see that the teachers considered that the students enjoyed the programs, and they were happy about. So, they got satisfaction and enjoyments from the programs as well. These results might suggest that the teachers, who enjoyed seeing their students improving in the course of teaching were student-centered.

III. Teachers' Views on the Practicality of Incorporating the Learning Tasks into the Regular Curriculum

The group-specific comments regarding the teachers' own views on the practicality of incorporating the learning tasks into the regular curriculum are charted in Table 4.28

below:

Table 4.28 Teachers' Own Views on the Practicality of Incorporating the Learning Tasks into the Regular Curriculum

Comments \ Group	A.G.	P.G.	C.G.
Class Size			
The class size and the teacher-student proportion may be a problem to this kind of teaching method; without a TA, the teacher may not be able to look after so many students, when playing games.	2V	V	V
Sub-total		4	
Resources			
The workload of the teacher would be too heavy.	V	--	--
There would not be enough time for the learning activities in regular lessons.	V	--	--
It would be difficult to conduct many learning activities, due to the constraint of a classroom.	--	--	V
The lack of resources may impede the incorporation of the learning tasks into the regular curriculum.	--	--	V
Sub-total		4	
Possible Channels of Incorporating the Learning Tasks into the Regular Curriculum			
The learning activities of the program can be selectively incorporated into the regular curriculum.	--	V	--
A "brain-based lesson" once a week.	--	V	--
They can be conducted in the extra-curricular sessions.	--	--	V
Sub-total		3	
Total of each subject group	4	3	5
Total of all groups		12	

Note: Same as those of Table 4.26.

As reflected from Table 4.28, from the teachers' perspective, the practicality of incorporating the learning tasks into the regular curriculum was determined by the class size (which was large in the Hong Kong classroom usually) and the human and financial resources (or, support) from the school. There were also some suggestions, for instance, to conduct the learning tasks in the after-school period (like the present study, which was held on Saturday).

Summary

By generalizing the results regarding the teachers' comments on the subjects' reactions to the learning tasks/ the programs (i.e., participation in class, learning attitudes, conducts, and interaction with the others), the similarity of the subjects' overall enhancements has been revealed—their teachers made more *positive* comments on their performances towards the end of the programs. Teachers' views on

the programs have also been reported. Positive comments were made on their perceived gains and enjoyments in brain-based teaching, which indicate that the brain-based teaching method and strategies (including student-centered teaching) were favored by them. Additionally, the teachers remarked that the practicality of incorporating the learning tasks into regular curriculum mainly depend on the considerations of class size and resources of different kinds. However, they also suggest ways to do so, for instance, to conduct the learning tasks in the after-school period.

4.3.3 Results of the Post-Program Oral Interview

The interview results of both the six subjects (two subjects from each group) and all the Picture Group subjects will be reported.

4.3.3.1 Interview on Two Subjects from Each Subject Group

Subjects' opinions on four aspects were summarized (see Table 4.29 & 4.30 below), which were the change in subjects' fondness in learning English, the change in their perception of learning English, their evaluation of the programs, and their tendency of joining a brain-based program in the future (for full version of the interviews, see Appendix N2).

Table 4.29 Subjects' Interview Results (Part 1)

Changes \ Group	A.G.	P.G.	C.G.
Fondness in Learning English			
Increased fondness	V	V	2V
No change	V	V	--
Decreased fondness	--	--	--
Views on Learning English			
More positive views	V	V	2V
No change	V	V	--
Less positive views	--	--	--
Evaluation of the Programs			
Positive	2V	2V	V
Neutral	--	--	--
Negative	--	--	V

Note:
(2)V: indicates the group to which the interviewee(s) belonged.
A.G.: Action Group

P.G.: Picture Group
C.G.: Combined Group

As is clear from Table 4.29, the A.G., and the P.G. subjects showed similar perception of the three studied aspects: *change in fondness in learning English*, *change in the views on learning English*, and *evaluation of the programs*. Yet, the C.G. subjects had more "votes" for "increased fondness" and "more positive views" on learning English after the program. Concerning evaluation of the programs, the A.G. and the P.G. subjects this time geared towards the positive evaluation of their respective programs, while the C.G. subjects had a negative comment about their program, which was concerned with the classmates quarreling with one another in the program (see Appendix N2), nothing to do with the program itself.

The subjects' tendency and reasons for joining a brain-based program in the future are also reported in Table 4.30 below:

Table 4.30 Subjects' Interview Results (Part 2)

Tendency \ Group	A.G.	P.G.	C.G.
Yes (For Learning English)			
Because I can learn more vocabulary.	V	--	--
Because I can learn more about English, so as to enhance myself.	V	--	--
Because I can learn English and play games, which is better than listening to bear the noise from the classmates in the regular lessons.	--	V	--
Because I want to grasp the chance to learn more difficult English words.	--	V	--
Yes (For Practical Reasons)			
Because I want to travel abroad, and when I get lost, I can use English to ask people for help.	--	--	V
Because I want to achieve better English results.	--	--	V
Yes (For other reasons)			
Because I felt happy learning in the program, so I will join it if given the chance.	V	--	--
No			
--	--	--	--

Note: Same as those of Table 4.29.

As is shown from Table 4.30, none of the six subjects expressed that they would not join a brain-based program in the future. It was found that the C.G. subjects would join the program for the reasons related to the practical aspect of learning English. However, most of the A.G. and the P.G. subjects would join the program,

because they wanted to learn more English. They thought the programs could help them learn English through having learning activities, which were games, in the subjects' eyes, which was also evidenced in an interview excerpt of an A.G. subject (see Interview I, Appendix N2):

> "In the [program], we can play many games. In regular lessons, we don't have so many games. (What do you think about the games? Could they help you learn; or, would you learn nothing because of concentrating in playing the games?) No, Those games were mostly related to English."

Summary

The results of the first part of the subjects' interviews revealed that there was no significant difference in the affective change of the interviewed subjects of the A.G. and the P.G. subject groups, while the C.G. had the most positive change of affect. These interview results correlate with those of the subjects' questionnaire results regarding subjects' changes in perceived English abilities and attitudes towards English (learning) (c.f. Section 4.3.2.1). Besides, it was found that the A.G. and the P.G. had similar evaluation of the programs, which was favorable on the whole, while a C.G. subject had one negative comment concerning the classmates. Lastly, all six interviewed subjects expressed that they would join a brain-based program in the future if given the chance. Though there were different reasons, for example, for learning English, and for some practical reasons.

4.3.3.2 Interview on All Picture Group Subjects

Table 4.31 below presents the summary of the interviews results of the Picture Group Subjects as regards the possibility of thinking about and performing the actions shown in the action verb *picture* cards (under no request of the Picture Group teachers):

Table 4.31 Picture Group Interview Results

Questions \ Yes/ No	Yes	No
Did you *think* about doing the action shown in the action verb picture cards by yourself or by others?	10	0
Did you *perform* the action shown in the action verb picture cards?	1	9

As is obvious from Table 4.31, *all* the Picture Group mentally simulated the actions depicted in the action verb picture cards, but only one of them did actually act out the actions.

4.3.4 The Research Hypotheses Tested

The null hypotheses formulated in Section 4.2.1 will be recapitulated and addressed below, and a summary of the testing results of the hypotheses is presented in Table 4.32:

Hypothesis 1 (H_0): The "actional" input will not enhance subjects' learning of English action verbs.

Hypothesis 2 (H_0): The "pictorial" input will not enhance subjects' learning of English action verbs.

Hypothesis 3 (H_0): The "combined" input will not enhance subjects' learning of English action verbs.

Hypothesis 4 (H_0): There will be a significant difference in the *linguistic* effects on the Action, the Picture, and the Combined Group.

Hypothesis 5 (H_0): The Action Group subjects will not have better perception of their English abilities and attitudes towards English (learning) after the Brain-based English Activity Program.

Hypothesis 6 (H_0): The Picture Group subjects will not have better perception of their English abilities and attitudes towards English (learning) after the Brain-based English Activity Program.

Hypothesis 7 (H_0): The Picture Group subjects will not have better perception of their English abilities and attitudes towards English (learning) after the Brain-based English Activity Program.

Hypothesis 8 (H_0): There will be a major difference in the *affective* effects of the programs on the Action, the Picture, and the Combined Group.

Table 4.32 Summary of Hypotheses-testing Results

Null Hypotheses	Construct	Instrument	Hypotheses (upheld/ rejected)
1	No A.G. within-group knowledge gain	Pre- and post-test	Rejected
2	No P.G. within-group knowledge gain	Pre- and post-test	Rejected
3	No C.G. within-group knowledge gain	Pre- and post-test	Rejected
4	A.G.-P.G.-C.G. difference in the knowledge gain	Pre- and post-test	Rejected
5	No A.G. within-group attitudinal change	• Post-program questionnaire • Post-program oral interview	Partially rejected
6	No P.G. within-group attitudinal change	• Post-program questionnaire • Post-program oral interview	Partially rejected
7	No C.G. within-group attitudinal change	• Post-program questionnaire • Post-program oral interview	Rejected
8	A.G.-P.G.-C.G. difference in the attitudinal change	• Post-program questionnaire • Post-program oral interview	Upheld

Note.
A.G.: Action Group
P.G.: Picture Group
C.G.: Combined Group

The first three hypotheses were rejected, suggesting that the Brain-based English Activity Programs did enhance the A.G. and the P.G. subjects' learning of English action verbs. However, the fourth hypothesis was rejected, since there was no significant difference in the *linguistic* effects on the A.G., the P. G. as well as the C.G. However, the fifth and the sixth hypothesis were partially rejected, which suggests

that the A.G. and the P.G. subjects overall had slightly better perception of their English abilities and attitudes towards English (learning) after the program. Yet, the seven hypothesis was rejected, suggesting that the C.G. subjects overall had better perception of their English abilities and attitudes towards English (learning) after the program. Lastly, the eighth hypothesis, in correlation with the fifth, the sixth, and the seventh hypothesis, was upheld, since that there was a major difference in the *affective* effects of the programs on the A.G., the P.G., and the C.G.

4.4 Summary of Major findings of the Second Study

The major findings of the present study are summarized in Table 4.33 and as follows:

Table 4.33 Links of Linguistic and Affective Effects on theThree Subject Groups

Group / Type of effect	Action Group		Picture Group		Combined Group
Linguistic	**Yes**	=	**Yes**	=	**Yes**
Affective	Yes	=	Yes	<	**Yes**

Note.
=: represents "being equal/ similar to"
Yes: represents "some positive effects"
Yes: represents "significant"/ "highly positive" effects
<: represents "more" significant/ highly positive effects

1. There was a **significant**, positive effect of the Brain-based English Activity Programs on the Action, the Picture, and the Combined Group subjects' learning of action verbs.
2. All the "actional", the "pictorial", and the "combined" input employed in the Brain-based English Activity Programs **equally** helped the learners to gain significantly on the knowledge level of the action verbs.
3. The Action and the Picture Group subjects, in general, showed **some** pre-post program difference in the perception of their English abilities and attitudes towards English (learning) after the program.

4. The *affective* effects of the programs were **not** equal on the Action, the Picture, and the Combined Group, which showed the **most** positive pre-post program difference in the subjects' perception of their English abilities and attitudes towards English (learning).

4.5 Evaluation of the Brain-based English Activity Programs 2004

The discussion of the major findings of the second study reported will be presented in the Chapter Five. Before moving on to the next chapter, the evaluation of the second study will be presented in this section. Whether and in what way the BEAPs 2004 has improved on last year's will be a main concern. The ways of improvement elicited from last year's first study were worked at accordingly and will be reported.

First of all, better coordination and rapport were established with the school, so that the school understood what would be required, and the school teachers were adequately briefed on the brain-based teaching framework.

Concerning the experimental teaching, the medium of instruction was standardized to be bilingual from the beginning till the end, with a trend of diffusing more and more English into the programs. The teaching of the three subject groups was carried out simultaneously by the same teaching crew allocated into specific groups. Furthermore, the time for each learning task was prolonged up to 45 minutes, which assimilated the usual classroom teaching time frame. Additionally, a 30-minute recess was provided. The learning tasks also had a modified, explicit construct of having a presentation/ revision part and an activity part. And, the attendance of the subjects was closely monitored.

As regards the administration of experimental procedures, the pre-program testing was arranged well before the programs started. The results were then obtained

early, according to which the students were assigned to different subject groups. The questionnaire survey included both the *pre-* and the *post-* program questionnaire forms, which made the pre-post program distinction clear. Qualitative research methods (e.g., subjects' interviews and teachers' questionnaire survey) were also incorporated to triangulate the data.

4.6 Summary of Chapter 4

Chapter Four describes, in detail, the establishment of the second study regarding each experimental procedure—the design, the instrumentation, the data collection procedures, and, furthermore, the results and analysis. The basic framework of the present study followed, with some modifications, from the first study described in the previous chapter.

This chapter begins with a summary description of the links between the first and the second study. This is followed by the subject selection criteria and an outline of the variables of the second study.

Second, the experimental treatment, including the design of the English Activity Programs 2004, the set-up of the subject groups and the teaching content of the programs, are described. The materials development was reported and specific introduction and consolidation learning tasks of the Combined Group were illustrated. The experimental teaching is also elaborated to illustrate how it has been improved from the last programs'.

Next, the construction of the instruments is described: the pre- and the post-program attainment test, the post-program questionnaire of the subjects and the teachers, and the oral interview of the subjects, which is followed by a summary and the description of the executed experimental procedures.

Finally, the data analysis is performed. The evaluation of the second study is also carried out through reviewing the implementation process.

Coming up in the next chapter will be the discussion of the major findings of the second study in relation to those of the first study—the parallel patterns of results will be discussed.

Chapter 5

DISCUSSION

5.1 Introduction

This chapter presents a discussion of the major findings of the second study and compares them with the findings of the first study: the *linguistic* (knowledge of action verbs gained) and the *affective* (the attitudinal change) effects on the A.G., the P.G., and the C.G. subjects will be explained and discussed in relation to those in the first study.

5.2 Discussion of the Major Findings of the Second and the First Study

The first section of the discussion focuses on the test results related to the first four hypotheses of the second study; the second section focuses on the questionnaire results related to the other four hypotheses.

5.2.1 Impact of the BEAPs on Learners' Action Verb Learning

The within-group pre-post test findings indicated that there was a **significant**, positive effect of the brain-based programs on the Action, the Picture, and the Combined Group subjects' learning of action verbs in the second study: i.e., all the "actional", the "pictorial", and the "combined" teaching input of the programs **equally** helped the learners to gain significantly on the knowledge level of the action verbs (c.f. Section 4.4). These findings exhibited a pattern very similar to those findings of the first study. Table 5.1 below summarizes and compares the test results of the second and the first study:

Table 5.1 Summary of the Pre- and Post-test Mean Scores of the Second and the First Study

	Study 2			Study 1		
	Pre-test	Post-test	Gain	Pre-test	Post-test	Gain
A. G.	18.90	32.33	71.06 %	9.08	15.54	71.15%
P. G.	19.50	32.10	64.62 %	9.64	15.09	56.54%
C. G.	18.90	33.90	79.37 %	--	--	--
		Average	71.68%		Average	63.84%

Note.
A.G.: Action Group
P.G.: Picture Group
C.G.: Combined Group
--: represents "not applicable"

5.2.1.1 Significant Linguistic Enhancement of All Subject Groups of Learners

The research design framework of the second study did not deviate from that of the first study, except that a Combined Group was incorporated serving as an extra channel to compare the "actional" and the pictorial" input (c.f. Section 4.2). As a result, the account for the significant linguistic effect brought about by the two teaching inputs of the first study (c.f. Section 3.5.1.1) would still be valid for the second study: the finding of the linguistic gain of the A.G. and the P.G. corroborate the education findings of the effectiveness of the "actional" and the "pictorial" input with reference to the **Total Physical Response** approach and the **Visual** approach to teaching and learning. It should be noted that the test results of the C.G. reflected this group's input model "inherited" half of the effectiveness from the "actional" input and half from the "pictorial" input, as no significant difference was found in the A.G.'s, the P.G.'s, and the C.G.'s post-test mean score. The similarity of the linguistic effects across different subject groups will be explicated in the next section.

5.2.1.2 Similar Patterns of Linguistic Effect on All Subject Groups of Learners

To account for the similarity of the linguistic result pattern of the A.G., the P.G., and the C.G. in the second study, let us recall the discussion in connection with the linguistic results of the first study (c.f. Section 3.5.1.2). There, we first appealed to

Caine & Caine's (1990) brain-based learning principle 5, which might serve to support the link between learning and emotions, and it was then suggested that the similarity of the linguistic gain of the A.G. and the P.G. was contributed by the similarity of the affective change of the two groups. However, a second possible explanation was also offered (c.f. Section 3.5.3), based on the "functional equivalence" found between action execution, simulation, observation, and verbalization and the possibility that the Picture Group subjects might think about (i.e., mentally simulate) and perform the actions shown in the action verb *picture* cards (without being asked by their teachers), which could make the cognitive processes involved in the P.G. similar to those in the A.G. In addition, *action verb processing* was found to be mediated by the brain areas responsible for "actions", which strengthened the idea that the cognitive processes involved in the P.G. were, in fact, similar to those in the A.G.

From the interview results, in the second study, it can be seen that *all* the Picture Group subjects, in fact, mentally simulated the actions depicted in the action verb picture cards (c.f. Section 4.3.3.2). So, the "actional" stimulus from the pictorial input (i.e., pictures of actions) was confirmed, besides the "actional" stimulus from processing the action verbs. The linguistic gain of the "combined" group, which showed no significant difference from that of the A.G. and the P.G., might serve to further confirm that the "actional" and the "pictorial" teaching input were, indeed, identical in their capability of enhancing the subjects' action verb learning, because the "actional" and "visual" stimuli and the corresponding cognitive processes involved in the three groups were similar (if not totally identical). Table 5.2 below presents a summary of the reasons why the different subject groups had similar pattern of linguistic enhancement:

Table 5.2 Summary of the Explanation for the Different Subject Groups' Results

	Action Group		**Picture Group**		**Combined Group**
Linguistic effect	**Yes**	=	**Yes**	=	**Yes**
Source of effect	"actional" & "visual" stimuli		"visual" & "actional" stimuli		Half: same as A.G. Half: same as P.G.

Note.
=: represents "being equal to"
Yes: represents "significant" effect

5.2.2 Possible Effects of the BEAPs on Learners' Perceived English Abilities and Attitudes towards English (Learning)

The A.G. and the P.G. subjects in the *second* study, in general, showed **some** pre-post program difference in the perception of their English abilities and attitudes towards English (learning) after the program, whereas the C.G. showed the **most** positive pre-post program difference in the subjects' perception of their English abilities and attitudes towards English (learning). Table 5.3 below summarizes the results of the pre-post program affective change in the second and the first study (c.f. Section 4.3.2.1 & 3.3.2.1):

Table 5.3 Results of the Pre-post Program Affective Change in the Second and the First study

	Study 2			**Study 1**	
	A.G.	P.G.	C.G.	A.G.	P.G.
Change of affect[1]	Yes	Yes	**Yes**	Yes	Yes

Note.
Yes: represents "some positive change"
Yes: represents "highly positive change"

5.2.2.1 Similar Positive Affective Change in the Action and the Picture Group

The similar pattern of affective effects on the A.G. and the P.G. was consistent with that in the first study. To account for the result pattern in the first study, it was

[1] The change of affect made reference to the results of the subjects' perceived English abilities, perception towards English learning and views on English.

suggested that although the input models for the two subject groups were different, the teaching-learning contexts for them were similar: both were brain-based . As the brain-based methodologies shaping the teaching-learning contexts (i.e., task-based teaching-learning and the cooperative learning approaches) were favored by the subjects, the positive affective effects of the BEAPs 2003 could be expounded.

The same explanation could be applied to this similar result pattern in the second study, as all the subjects (including the A.G. and the P.G.) indicated *can have many activities/ games* and *can learn in small groups* as the top two most preferred elements of learning English after the programs (c.f. Section 4.1.4). This result might suggest that the task-based teaching-learning and the cooperative learning approaches were, indeed, successful in capturing what the learners preferred and in providing an enriched and emotionally supportive learning environment for them.

Comparing the affective effects on the A.G. and the P.G. of the first and the second study, it seems that the attitudinal change of the second study was less favorable (though positive) than those of the first study. One possible account for this may be related to the time frame for the program of the second study, which was different from that of the first study. The BEAPs 2004 were conducted on an extra-curricular course basis (across 8 Saturdays), and the subjects, other than having the English sessions of the program, also had regular English lessons. On the one hand, the regular English lessons would give extra English inputs to the subjects, and might, in some way, affect the subjects' perceived English abilities and attitudes towards English (learning); on the other hand, the programs were not as intensive as the programs of the *first* study were, and the affective effects of the programs might then be "diluted". If so, this factor should have affected all three subject groups. However, the affective effects on the C.G. subjects in the *second* study were still highly positive

and were the most salient among all the subject groups. The reason for the C.G.'s affective effects will be explained in the coming section.

5.2.2.2 The Most Positive Affective Change in the Combined Group Learners

It was revealed that the affective change brought about by the "actional" and the "pictorial" teaching model were equal in the two studies. Yet, when the two teaching models were combined into one, some "chemical effects" in the affect of learning appear to have sparked. The reason for this might be provided for by some brain-based learning principles for teaching (c.f. Section 2.2.4.4): that good teaching should "orchestrate" all the dimensions of parallel processing, encompassing a *variety* of strategies and techniques, in order to engage the students' brains and fully immerse the students in an educational experience (brain-based learning principle 1); should utilize all the senses and immerse the learners in a multitude of complex and interactive experiences (brain-based learning principle 10); should be *multifaceted* to create room for students to express visual, tactile, emotional, or auditory preferences (brain-based learning principle 12); and should be *enriched*, for example, by stimulating a greater number of neural networks and more senses and interests of the learners (Jensen, 1998b; Wolfe & Brandt, 1998).

The brain-based programs, in general, satisfied the above brain-based learning principles (in association with "variety"), because they provided an array of teaching strategies including group work and interaction, competitions, having task-based imaginative and problem-solving learning contexts, which were the same across the A.G., the P.G. and the C.G. (c.f. Section 4.2.4, 4.2.5, & 4.2.6). Yet, concerning the design of the teaching input and the learners' actual experience of it, there was a difference: the C.G. received physical actions as the "actional" input (the same as the A.G., but lacked by the P.G.), while the "visual" input was real pictures

(the same as the P.G., but lacked by the A.G.). In the activity part of the C.G.'s learning tasks, the first round was devoted to "action"; "picture" would be used in the second round, and vice versa. So, the "combined" or *dual-* teaching model input might have been more versatile, which would have **more** effectively satisfied the brain-based learning principles than the A.G. and the P.G. did (presented in a *mono-* teaching input model, due to the constraint of the research design), and made the C.G. subjects feel "happy" in learning. And, the negative effect of the mono-teaching input could be seen in the questionnaire results of the A.G. and the P.G. teachers (c.f. Section 4.3.2.2), in which the A.G. teachers commented that "the students seemed a bit bored by the repeated action practice in the revision part," and a P.G. teacher stated that "some students might not pay full attention, because some activities were not as interesting as those in the beginning." It can be seen that for the A.G., the subjects appeared to be bored by the *mono-* teaching input that is through repeated action practice, following the research design that the subjects learnt and revised *only* through the actional means. The same could be said of the P.G., which used a mono-teaching input, and the subjects of this group also showed a decrease of interest in the learning activities.

Therefore, we may conclude that a variety of the teaching input (versus repetition of the same mode of input) was crucial to the learners' attitudes and perceptions towards English (learning). If a teaching input model was repeatedly used during a program/ course that comprised a single unit of teaching content (in our case, action verb learning), it would make learning less interesting (as indicated by the A.G. and the P.G. teachers' questionnaire data mentioned in the Section 5.2.2.1 above).

It is the experience of the *variety* of the teaching input that made a

fundamental difference in the action verb learning in the second study, which might have contributed to the highly positive affective effects of the program on the C.G. learners. Table 5.4 below presents a summary of the reasons why the A.G. and the P.G. subjects showed similar pattern of affective effects, whereas the C.G. showed the most positive change of affect:

Table 5.4 Summary of the Explanation for Different Subject Groups' Affective Effects

	Action Group	**Picture Group**	**Combined Group**
Affective effects	Yes	Yes	**Yes**
Source of effects	Mono-teaching input model	Mono-teaching input model	Dual-teaching input model

Note.
Yes: represents "some positive change"
Yes: represents "highly positive" effects

5.3 Summary of the Links between the Major Findings of the Second and the First Study

Two of the conclusions drawn from the findings of the first study seem to be "overthrown" in the second study; the second study had an extra teaching input model (i.e., the "combined" input) and was conducted in a better condition of research. So, these two conclusions will first be re-addressed and elucidated. Besides, two other conclusions drawn from the comparison of the findings of the two studies will also be put forth.

First, **the link of the linguistic and the affective effects** could not be established, which would be different from one of the conclusions of the first study (c.f. Section 3.5.3): that the similarity of the linguistic gain of the two groups was contributed by the similarity of affective effects on the two groups by appealing to Caine & Caine's (1990) brain-based learning principle. In the discussion there and then, we were not certain the extent to which emotions would affect learning.

Furthermore, the "functional equivalence" account for the similar cognitive processes and patterns of learning results of the different subject groups was provided later only. In the second study, it was found that the "functional equivalence" account could serve better to support the results (c.f. Section 5.2.1.2), and the C.G. subjects showed highly positive change of affect, but they did not outperform the other two groups in linguistic gain from the programs. As a result, it is now suggested that the linguistic and the affective effects are neither necessarily interdependent nor can they be represented by a specific "formula". Yet, we know that learning is developmental. It may be possible that the change of affect in the subjects might take time to be revealed on the linguistic side of the learning outcomes, and the relationship of the two kinds of effects or learning outcomes is yet to be explored.

Second, it was observed in the first study that the **type of teaching input** (whether "actional or "pictorial) might not be the key that would make a difference in the affective or attitudinal aspect of the different teaching input models, which were operated in *similar* brain-based teaching and learning contexts (c.f. Section 3.5.3). However, in the second study, with the inclusion of the "combined" teaching input model, the brain-based teaching and learning contexts of the different subject groups showed a difference. Unlike the two other subject group's teaching-learning contexts, the C.G.'s was *enriched* by the "combined" teaching input (i.e., a dual-input model) stimulating more senses and interests of the learners (c.f. Section 4.2). It was found that the "actional" and the "pictorial" teaching input model only brought about some affective change in the A.G. and the P.G. subjects (c.f. Section 5.2.2.1), whereas the "combined" teaching input did overtly enhance the C.G. subjects' perceived English abilities, their attitudes towards English (learning) and their views on English (c.f. Section 5.2.2.2). When comparing the "actional" and the "pictorial" with the

"combined" teaching input model, we may say that the monotony of the single teaching input model used throughout the program might have adversely affected the A.G. and the P.G. subjects' emotions. The type of input (or, more precisely, the variety of input type) did make a marked difference in the affective effects of the programs in the second study. We may, therefore, conclude that the degree of the *variety of input type* would be an important factor that determined the learning environment as well as the learners' feelings and perception of English in the second study.

Last but not least, what the learners preferred should not be overlooked, which included the **task-based teaching-learning approach** and the **group-based orientation** (cooperative learning). In the second study, the subjects of the different groups, in general, mostly preferred *can have many activities/ games*, and *can learn in small groups* (c.f. Section 4.3.2.1), which was consistent with the subjects of the first study, who preferred *learning activities*, *teaching method*, and *classmates* (c.f. Section 3.3.2.2), through which the positive affective change in the first study as explained. Brain-based learning Principle 5 suggests that teachers must understand that learners' emotions will be involved in learning and *cooperative learning* approach or getting students into groups can provide a supportive emotional climate for them to learn (c.f. Section 2.2.4.4).

5.4 Summary of Chapter 5

The corroboration and the divergence between the findings of the first and the second study were discussed. The linguistic gain of the different subject groups in the second study was explained with reference to the educational findings of their respective teaching input models. The similar patterns of the linguistic gains of the different

subject groups in the first study were repeated in the second study, and the result patterns in the second study were explained, from the neurocognitive aspect, with the "functional equivalence" account.

Regarding the affective effects, the A.G. and the P.G. of the second study showed some positive affective effects, having much to do with the brain-based educational methodologies (i.e., task-based and group-based teaching-learning approaches). The patterns of similar affective effects of the two groups were consistent with those in the first study, and were, thus, explained through similar accounts—having similar brain-based teaching-learning contexts which were favored by the two subject groups might have resulted in similar affective change.

The links between the second and the first study were also summarized. First, the *link of the linguistic effects and the affective effects* was not perceived as strong as it was originally proposed in the first study, because the C.G. subjects had the most positive changes of affect after the program, but their linguistic gain was similar to that of the A.G. and the P.G. Second, the *type of input* (or, to be more specific, the *variety* of the input type) might have contributed a difference to the affective effects of the brain-based programs. Lastly, learners' preferences (i.e., the task-based teaching-learning approach and the group-based /cooperative learning orientation) were coherent in the first and second study, which provided a reason for similar result patterns of the positive affective change in the A.G. and the P.G.

Chapter 6

CONCLUSION

This last chapter of the thesis starts with a number of issues in regard to teaching English (action verbs) in the FL classroom, and then, it closes with an examination of where the research can go from these studies and point out the directions for future research.

6.1 Advice on Teaching English Action Verbs

For the teachers who wish to teach English action verbs, the following points should be taken into consideration:

6.1.1 Possible Misconception of the Superiority of Using "Actions" to "Pictures"

The two studies reported have shown that the "actional" and the "pictorial" teaching input model both led to linguistic enhancement in the subjects. But, some English teachers might have assumed that using "actions" to teach *action* verbs would seem logical and effective. The consistent linguistic results of the two studies reject this assumption. Pedagogically, the pictures were simple line drawings/ illustrations, but they could equally depict the actions as vividly as the physical movements would. More importantly, recent neurocognitive science has advanced the functional equivalence theory that pictures of actions could have the same functions as actions in stimulating the action-related brain areas (on condition that the students who viewed the pictures mentally simulated the actions). So, on the linguistic level, there was no superiority of "actions" to "pictures". Practically speaking, the action verb pictures are simple line drawings. They could be produced in a number of convenient ways: 1) drawing by the computer-based tools (e.g., *Paint* of Windows XP); 2) drawing by

hand (if talented in Art); 3) downloading from the web (but check if they do *totally* suit the teaching purpose, the level of the subjects, and, of course the subject matter and the content (the meaning of the action verbs to be taught); 4) copying from the kindergarten materials (which are useful, simple, and beautifully drawn, but check the copyright!).

In the affective domain, the results of the two studies indicate that the superiority of "actions" to "pictures" similarly does not hold. Specifically, the results of the questionnaire surveys in the two studies show that the affective effects of the "actional" and the "pictorial" teaching input model were the same. Thus, on both the *linguistic* and the *affective* level, no hierarchical relationship priority could be found in the two teaching input models. In fact, the two studies have shed some light on the "active" (i.e., the "actional") and the "less active" (i.e., the "pictorial") model/ method in English language teaching and learning: could both be good methods. In considering which teaching model to use when teaching English in general, and English action verbs in particular, teachers could consider one or the other option or a combination of both.

6.1.2 Versatility of a Combined Teaching Model

If a teacher would like to look for a more optimal teaching input model, the "combined" teaching input model from the "actional" and the "pictorial" input could be a good choice. However, it should be noted that the "actional", the "pictorial", or the "combined" teaching input model was shown to be equally capable to help learners to learn English action verbs. It is the affective side of learning where the difference showed up and where the choice lies. The Combined Group subjects showed more favorable perception of and attitudes towards English (learning) than the other two groups of subjects did, suggesting that the "combined" teaching input model

could free the subjects from feeling bored resulting from a monotony of a single teaching "method" (i.e., by repeated action practice of a mono-teaching input), due to a *variety* of input and a more enriched learning environment through *dual* teaching input model. Hence, English teachers should not be hesitant to use versatile teaching inputs and materials (within their grasp of teaching time and classroom management).

Learning and emotions or affect, as mentioned, are intermingled and interactive (c.f. Section 3.5.1.2) and might, to a certain extent, be co-dependent. Brain-based learning theory has pointed out that the brain is a natural meaning-seeking mechanism, which means that the brain naturally has a need for learning. If learning takes place at the right time and in a right environment, it will satisfy the brains and contribute to the positive emotions of the learners. And the positive emotions will, in turn, contribute to a greater level of willingness and a greater degree of learning in the future (c.f. Section 2.2.4.4). Positive emotions could be steered by appropriate learning, while learning inevitably involves emotions and could be facilitated by positive emotions. So, if the "combined" teaching models could, indeed, produce more positive affect in the learners, we would anticipate equal enhancement on the linguistic side in the long run. This is a case of symbiosis.

6.1.3 Task-based Teaching Approach and Group-based Learning

In the two studies, the learners' evaluations of their respective programs in relation to their learning preferences were similar: the task-based teaching approach and the group-based orientation were favored (c.f. Section 3.3.2.2 & 4.3.2.1). As these two teaching strategies satisfied both the brain-based learning theory and the Primary 3 learners' preferences and interests, it would, therefore, be reasonable to recommend them when teaching English (action verbs).

6.1.4 Practicability of Incorporating the Brain-based English Program in the Regular School's Curriculum

According to the teachers of the programs in the second study, there were two major sources of difficulties in executing brain-based learning tasks in regular lesson, namely, *class size* and *resources*. Suggestions were made that the learning tasks be carried out selectively, once a week or in the extra-curricular period after school (Section 4.3.2.2). These suggestions would, however, make brain-based learning in a loose fashion as opposed to an intensive and concentrated one, and it would be more difficult for the teachers to assess the students' affective outcome of the learning, since the affective effects induced by the once-a-week learning would be unclear. And, this needs to be sought out in the hands of education policy-makers.

Brief Conclusion

The two studies have succeeded in answering the research questions, concerning the comparisons of the learning outcomes (on the linguistic and affective level) between the "actional" and the "pictorial" teaching input model in a brain-based teaching-learning framework. And, some pedagogical implications for the classroom teaching of the English (action verbs) have been discussed. Hence, we can conclude that the aims of the present research have been fulfilled. However, we should not stop at this point. The findings (c.f. Section 5.3) together with the implications (c.f. Section 6.1) are tentative. Without expanding the "life" and the scope of the research, what we know about teaching English using a brain-based teaching-learning framework would still be small and limited.

6.2 Suggestions for Future Research

The two studies conducted focused on the linguistic and affective outcomes of learning, using the "actional", the "pictorial" and the "combined" teaching input model to teaching English action verbs in a brain-based teaching-learning framework. Some areas in the present research could be further explored and will be presented in this section. Recommendations for future research will also be offered.

6.2.1 Pursuing a Longitudinal Study (with Delayed Tests)

As we know, learning is cumulative and developmental (c.f. Section 2.2.4.4), meaning that it needs time for the outcomes of learning to "flourish" and be seen. Should there be a positive link between the affective and the linguistic effects in the "combined" teaching input model, it would still require some time to surface. In addition, the extent to which the affective effects could and would influence the linguistic effects of the brain-based programs is still largely unknown. A longitudinal study involving interval evaluation or assessment during the experimental treatment as well as some delayed tests might help to see the full effects of the treatment and the long-term learning and attitudinal effects.

6.2.2 Variety of Teaching Input Type

As the second study has shown the mono-teaching input model was not as good as the dual-input one in bringing about a positive change of affect, owing to the variety of the input type. In this light, a "combined" teaching input from the "actional" and the "pictorial" input might have better suited the learning preferences and interests of different learners. However, the scope or degree of input variety in a brain-based program that would influence the affective effects is still not known. (For example, would a triple-teaching input be 3 times as effective as a mono-input one in enhancing learners' affect?) The two teaching input models of the present studies echo Gardner's

(1983) and Reid's (1987) learning styles models, but only two of their learning styles were highlighted (i.e., *kinesthetic* and *visual* intelligence/ sensory preference). So, it might be interesting to replicate the study using other learning styles (e.g., auditory) to evaluate the effectiveness of a mono-, dual-, a tri- (or more) teaching input model.

6.2.3 Other Grammar/ Skills Areas

The focus of the two studies was on the teaching and learning of English action verbs using the "actions" and "pictures". In order to understand the effectiveness of the different teaching input models that tap learners' preferences in a brain-based teaching-learning framework, other grammar or skills areas (e.g., sentence comprehension, listening comprehension etc.) could be used as the teaching content. However, it should be noted that the localization of brain functions concerning the new teaching content should first be researched and identified by reviewing the relevant neurocognitive science studies.

6.2.4 Cognitive Tasks that Share No Common Brain Areas

The original hypothesis and assumption of the first study was that the neurocognitively different input models of the Action and the Picture Group would create a different picture for the learning of action verbs. It was subsequently amended after a second look at the brain research literature. Seeing this, we would recommend a study to be carried out on this original hypothesis (the input modalities would be different from the present studies'), so as to examine if the neurocognitive difference could be seen in pedagogical terms (for the present studies, it has been posited that the similarity of the studied cognitive tasks led to the similarity of the associated linguistic results).

6.2.5 Gender Difference

The factor of male-female difference was not explored in the present research of the

linguistic and the affective effects of the "actional" and "pictorial" input on the learners. In the neurocognitive science domain, there have been studies on gender difference in regard to different brain functions (e.g., Berenbaum *et al.*, 1997; Frost *et al.*, 1999; Herlitz *et al.*, 1999). In order to study this factor, we may have 1 Action Group of all males and 1 of females, and, likewise, 1 male and 1 female Picture Group. By having these gender-specific subject groups, we might be able to look into the gender difference in the linguistic and affective aspect of learning in brain-based education.

6.2.6 English Proficiency Level

Learners of different English proficiency level might exhibit different responses to the Brain-based English Activity Programs, and thus affect the learning outcomes. Since we did not use formal assessment to measure the subjects' English proficiency level, no solid conclusions could be made about the difference in the linguistic and affective effects on the subjects of reportedly different English proficiency levels. Therefore, this is a relevant variable in future research and exploration.

Brief Conclusion

Classrooms are intentionally designed for the purpose of bringing about learning; classrooms are "where the action is" (Nunan, 1989). Yet, the students' brains are "where the learning is." If the English language classroom is desirable for the functioning of the students' brains, the learning processes should naturally occur and even be promoted. However, since Caine and Caine's (1990) brain-based learning principles are not constructed by virtue of quantitative measurement, it is somehow difficult to tell whether particular challenges or novelty to the students are too much or too little. In fact, both cases have to be avoided, or else students will either give up or fall asleep (Jensen, 1998b). The most suitable resolution should indeed be sought

through extensive education research (preferably working hand in hand with the brain researchers).

6.3 Summary of Chapter 6

The chapter consists of two major sections: first, the considerations of teaching English action verbs in the FL classroom; second, the directions for future research.

Concerning the first section, the misconceived superiority of the "actional" (or more active) teaching input model to the "pictorial" (or less active) teaching input model in action verb teaching-learning is first clarified. The more versatile model of "combined" teaching input is recommended for teaching English in general (and English action verbs in particular), and the task-based and group-based approaches to teaching-learning is also recommended, making reference to what the learners mostly preferred in the brain-based programs. Besides, the practicality of incorporating the brain-based learning tasks into regular school's curriculum is also considered, in the light of the teachers' comments from the second study.

As regards the second section, a longitudinal study is recommended, which allows time for the full effects of the treatment to realize. Besides, the variety of the teaching input type may also be an area for further research: for example, the present studies could be replicated using new teaching input models. Other grammar or skills areas could replace action verb as the areas of teaching content. A study based on the original assumption is proposed to investigate if the difference in the neural correlates of the studied cognitive tasks could be seen in pedagogical terms. Besides, the male-female difference in learning, in both educational and neurocognitive terms, could be explored. Finally, it is suggested that learners' English proficiency level might also serve as a possible factor that influences the language learning and affective outcomes.

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APPENDIX A1. Percent of Studies[1] by Categories that Have Reported Activation in Specific Cortical Area

Cortical regions	Task	Left hemisphere	Right hemisphere
Primary motor cortex (M1)	Execution	87.5%	50%
	Simulation	16.6%	16.6%
	Observation	0	0
	Verbalization	0	0
Sensorimotor cortex (S1)	Execution	37.5%	12.5%
	Simulation	0	0
	Observation	0	0
	Verbalization	0	0
Dorsal part of the premotor cortex: dPMd	Execution	50%	87.5%
	Simulation	833%	66.6%
	Observation	37.5%	37.5%
	Verbalization	12.5%	0
Ventral part of the dorsal premotor cortex: vPMd	Execution	12.5%	37.5%
	Simulation	66.6%	50%
	Observation	0	0
	Verbalization	75%	0
Opercular premotor cortex	Execution	25%	37.5%
	Simulation	66.6%	50%
	Observation	0	0
	Verbalization	0	0
Broca area 44	Execution	0	0
	Simulation	16.6%	16.6%
	Observation	12.5%	0
	Verbalization	75%	12.5%
Broca area 45	Execution	0	0
	Simulation	0	16.6%
	Observation	0	0
	Verbalization	62.5%	12.5%
Ventral part of the dorsolateral prefrontal gyrus	Execution	25%	12.5%
	Simulation	16.6%	0
	Observation	25%	12.5%
	Verbalization	37.5%	0
Dorsal part of the dorsolateral prefrontal gyrus	Execution	12.5%	12.5%
	Simulation	83.3%	0
	Observation	25%	12.5%
	Verbalization	0	12.5%
Supramarginal gyrus	Execution	50%	50%
	Simulation	100%	50%
	Observation	75%	50%
	Verbalization	0	12.5%
Angular gyrus	Execution	12.5%	12.5%
	Simulation	0	0
	Observation	0	0
	Verbalization	25%	0
Superior parietal lobe	Execution	50%	87.5%
	Simulation	50%	33.3%
	Observation	50%	50%
	Verbalization	0	0
Superior occipital gyrus / Precuneus	Execution	25%	12.5%
	Simulation	16.6%	0
	Observation	62.5%	37.5%
	Verbalization	12.5%	0
Middle temporal gyrus / superior temporal gyrus	Execution	0	0
	Simulation	0	0
	Observation	62.5%	37.5%
	Verbalization	75%	12.5%
Inferior temporal gyrus	Execution	0	0
	Simulation	0	0
	Observation	37.5%	0
	Verbalization	25%	0
MT / V5	Execution	0	0
	Simulation	0	0
	Observation	50%	37.5%
	Verbalization	0	0

Note. The table is freely adapted from Grèzes & Decety's (2001: 9) review study.

[1] Studies that are involved in Grèzes & Decety's (2001) meta-analysis of functional anatomy of execution,

APPENDIX A2. Cognitive Processes Involved in the "Actional" Input

Input	Brain areas[2]	Cognitive processes[3] (specific cortical area)
Action[4] • **Execution of action** • **Mental simulation of action** • **Observation of action** • **Motor learning**	**Premotor cortex**	- Execution of action - Mental simulation of action - Observation of action (l. premotor cortex) - Motor learning (ipsilateral premotor area)
	Motor cortex	- Execution of action - Mental simulation of action - Motor learning
	Supplementary motor area	- Execution of action - Motor learning
	Cingulate gyrus	- Execution of action - Mental simulation of action (posterior cingulate) - Observation of action - Motor learning (anterior cingulate cortex)
	Cerebellum	- Execution of action - Mental simulation of action - Motor learning
	Parietal	- Execution of action (inferior and superior parietal lobes) - Mental simulation of action (l. & r. inferior parietal lobe) - Observation of action (l. & r. parietal) - Motor learning (r. inferior and bilateral posterior parietal areas)
	Occipital gyrus	- Observation of action (l. & r. superior occipital gyrus)
	Prefrontal	- Mental simulation of action (dorsolateral prefrontal cortex) - Motor learning (r. prefrontal area)
	Frontal	- Observation of action (l. inferior and middle frontal gyri) - Mental simulation of action (l. inferior frontal)
	Precentral gyrus	- Mental simulation of action
	Somatosensory area	- Mental simulation of action - Observation of action - Motor learning
	Subcortical nuclei	- Mental simulation of action
	Temporal gyrus	- Observation of action (l. middle temporal gyrus) - Motor learning (bilateral temporal cortex)
	Precuneus	- Mental simulation of action - Motor learning
	MT/V5	- Mental simulation of action
	Frontopolar cortex	- Mental simulation of action
	Basal ganglia	- Motor learning (l. basal ganglia)

mental simulation, observation and verb generation of actions.

[2] The brain areas repeated in "actions" and "pictures" are highlighted

[3] The abbreviations used include "l." for left and "r." for right.

[4] Verbalization of action, a cognitive process related to "actions", is taken out, owing to its involvement in both subject groups (i.e. the Action Group and the Picture Group).

Appendix A3. Cognitive Processes Involved in the "Pictorial" Input

Input	Brain areas	Cognitive processes (specific cortical area)
Picture • Associative encoding • Encoding of novel pictures • Semantic encoding • Intentional encoding	**Hippocampus**	- Associative encoding (l. Hippocampus) - Novel picture encoding (bilateral posterior hippocampal formation)
	Parahippocampal	- Associative encoding (l. Parahippocampal) - Novel picture encoding (bilateral parahippocampal gyrus)
	Cingulate gyrus	- Associative encoding (l. and r. cingulate gyrus)
	Prefrontal	- Associative encoding (r. prefrontal) - Semantic encoding (l. ventral, dorsal medial prefrontal) - Intentional learning (l. ventrolateral prefrontal cortex)
	Lingual gyri	- Novel picture encoding (bilateral lingual gyri)
	Fusiform gyri	- Novel picture encoding (bilateral fusiform gyri)
	Medial Temporal	- Associative encoding - Semantic encoding
	Insula	- Semantic encoding (posterior insula)
	Extrastriate cortex	- Semantic encoding (bilateral posterior extrastriate cortex) - Intentional learning (bilateral ventral extrastriate cortex)
	Premotor cortex	- Intentional learning (l. premotor cortex)
	Caudate nucleus	- Intentional learning

APPENDIX B1. BEAPs 2003 Action Verb List

A

Answer	I: # 3[5]
	C: # 39, 34
Ask (about; for) 3B[6]	I: # 3
	C: # 39, 34, 36

B

Bark (at) 2B	I: # 1
	C: # 34, 36, 35
Barbecue	I: # 2, 48
	C: # 39, 34, 36, 44, 35
Blow	I: # 13 (away), 48 (away)
	C: # 38, 45, 44, 57
Break	I: # 2, 48
	C: # 39, 36, 44
Bring 2B	I: # 1, 2
	C: # 39, 34
Brush 2B	I: # 8, 19
	C: # 43, 44, 57, 33
Buy 3B	I: # 6, 48
	C: # 27, 44

C

Clap 3A	I: # 1, 13, 41
	C: # 34, 37, 43, 45, 38, 33
Clean (out; off) 3B	I: # 6, 8
	C: # 27, 44
Climb (on; over) 3B	I: # 1, 2
	C: # 34, 44
Close 3B	I: #31
	C:# 37, 38, 45
Comb	I: # 6, 19
	C: # 27, 36, 44, 35
Come 3B	I: # 19, 31
	C: # 37, 38, 43, 45, 33
Cook 3B	I: # 6, 48
	C: # 27, 36
Crawl	I: # 31, 40, 41
	C: # 37, 38, 43, 45, 29, 33
Cut	I: # 6, 13
	C: # 27, 45, 36, 44

[5] The task numbers of the Action Group's learning tasks.
[6] The number of the series: the verb is encoded with the number when it first appears in the text, starting from 3B to 1A.

D

Dance 3A	I: # 3 C: # 39, 34, 29
Dial	I: # 6, 48 C: # 27, 36, 35, 44
Do	I: # 19 C: # 43, 36, 35, 33
Draw 3B	I: # 2 C: # 39, 36
Drink 2A	I: # 1, 6 C: # 27, 34

E

Eat 3B	I: # 13, 19 C: # 43, 45, 33

F

Faint	I: # 41 C: # 37, 43, 36, 44, 35, 33
Fall 1A	I: # 41, 48 C: # 37, 43, 44, 33
Feed 2A	I: # 3, 48 C: # 39, 34, 44
Fight 3A	I: # 2, 3 C: # 39, 34, 44
Flap	I: # 41, 48 C: # 37, 43, 36, 35, 33

G

Get 3B	I: # 5, 19 C: # 24, 43, 33
Go 3B	I: # 1, 19 C: # 34, 37, 43, 33
Greet	I: # 5, 13 C: # 24, 45, 36, 35

H

Hug	I: # 3, 5 C: # 24, 36, 44, 35

I

Iron 2A	I: # 6 C: # 27, 57

J

Jump 3B	I: # 31, 41 C: # 37, 38, 43, 45, 33

K

Kiss	I: # 3 C: # 39, 34, 44, 36

L

Laugh 3A	I: # 31 C: # 37, 38, 29
Lick	I: # 1, 48 C: # 34, 36, 57, 35`

M

Make 3B	I: # 13, 48 C: # 45

O

Open 3B	I: # 5, 13 C: # 24, 37

P

Plant	I: # 6 C: # 3, 27, 44
Pick 3B	I: # 2 C: # 39, 36
Play 3B	I: # 2, 13 C: # 39, 45
Press	I: # 5, 48 C: # 24, 36, 44, 29
Pull	I: # 41, 48 C: # 37, 43, 36, 57, 33
Push 3A	I: # 5, 48 C:# 24, 57

R

Ride 3B	I: # 2, 6 C: # 39, 27
Run 3B	I: # 1, 2 C: # 34, 39

S

Shake	I: # 3, 31, 48 C: # 39, 34, 38, 37, 45
Sit 3B	I: # 31 C: # 37, 38, 45, 29
Slap	I: # 3, 48 C: # 39, 34, 36, 44
Sing 3B	I: # 13 C: # 45, 57, 44
Smell 3B	I: # 1 C: # 33, 34, 36, 44
Smile	I: # 31 C: # 37, 38, 57, 44
Squat	I: # 31 C: # 37, 38, 45, 29, 44, 35
Stand 1A	I: #31 C: #37, 38, 45, 29
Stomp	I: # 41, 48 C: # 37, 43, 57, 44, 33

Swim 3B	I: # 1 C: # 33,34, 44

T

Take 3B	I: # 19 C: # 43, 44, 33
Talk 3B	I: # 5, 31 C: # 24, 37, 38, 45
Touch 3B	I: # 41 C: # 37, 43, 29, 33
Turn 3B	I: # 41 C: # 37, 43, 35, 33
Twist	I: # 1, 48 C: # 34, 44, 36, 35, 29

W

Walk 3B	I: # 2, 5 C: # 24, 39, 29
Wash 2A	I: # 19 C: # 43, 44, 33
Watch 3B	I: # 19 C: # 43, 44, 33
Wave	I: # 5, 48 C: # 24, 57, 36, 35
Write 3B	I: # 6 C: # 27, 44, 35

Y

Yawn	I: # 3,19 C: # 34, 43, 39, 57, 44, 35, 33

APPENDIX B2. BEAPs 2003 Distribution of Action Verbs in the Learning Tasks

Session 1

Action verbs: stand, sit, close, talk, run, jump, come, squat, crawl, smile, laugh, shake
Introduction: # 31[7]
Consolidation: (# 37) , #38, #45

Session 2

Action verbs: greet, play, sing, make, blow, clap, cut, open, eat
Introduction: # 13
Consolidation: # 38, #45

Session 3

Action verbs: wave, talk, get, walk, press, push, open, greet, hug
Introduction: # 5
Consolidation: # 24

Session 4

Action verbs: Cut-cutter, comb-comb, dial-telephone, drink-cup, iron-iron, cook-wok/ pan, write-pen/ pencil, buy-money, clean-money, ride-bicycle, plant-flowers
Introduction: # 6
Consolidation: # 27

Session 5

Action verbs: Barbecue- BBQ fork Blow (away)- a balloon Cook- some food Lick- ice cream Pick- some flowers Pull- a door Push- a door Shake- some French Fries Slap- my face Stomp- your feet Wave- your hands Twist- your arm Break- a window Buy- a birthday cake Dial- a telephone number Do- homework Fall- into a big hole Feed- some animals Flap- your arms Make- a wish Press- a button
Introduction /Consolidation: # 48

[7] The task numbers of the Action Group's learning tasks.

Session 6

Action verbs: get, brush, wash, eat, go, come, do, watch, take, yawn
Introduction: # 19
Consolidation: # 43, 33

Session 7

Action verbs: clap, stomp, turn, touch, pull, flap, jump, fall, crawl, faint
Introduction: # 41
Consolidation: #37, 43, 33

Session 8

Action verbs: smell, go, drink, spill, swim, climb, lick, clap, twist, run, back
Introduction: # 1
Consolidation: # 34

Action verbs: walk, pick, bring, ride, play, barbecue, fight, run, break, draw
Introduction: # 2
Consolidation: # 34, 39,

Session 9

Action verbs: shake, kiss, slap, ask, answer, dance, feed, hug, yawn, fight
Introduction: # 3
Consolidation: # 34, 39

Session 10: General consolidation

Action verbs: Ask (a question), bark, barbecue, break, comb, cook, cut, dial, do (homework), draw, faint, flap (your arms), greet (the other student), hug (the other student), kiss (your hand), lick (your lip), pick, press, pull, slap (your face), smell, twist (your body), wave (your hand)
Consolidation: # 36 Pass the Hat! Pass the Bag!
Action verbs: blow, iron, lick (your lip), pull, push, sing, smile, stomp (your feet), yawn, wave (goodbye), brush (your teeth)
Consolidation: # 57 Slam the Dummies

Action verbs: blow, kiss, plant, slap (your face), twist (your body), barbecue, , break, yawn, buy, brush, clean (a table), climb, comb, cut, dial, faint, fall, feed, fight, hug, press, sing, smell, smile, squat, stomp (your feet), swim, take, wash, watch, write
Consolidation: # 44 Guesstures

Action verbs: yawn squat bark barbecue comb (your hair) dial (999) do (homework) faint (on the floor) flap (your arms) turn (around) greet (your teacher) hug (your friend) lick (your lip) twist (your body) wave (goodbye) write (your name)
Consolidation: # 35 Pass the Massage

Action verbs: walk to square (e.g. 5) crawl to square ( ) squat on square ( ) stand on square ( ) dance on square ( ) sit on square ( ) fall on square ( ) twist your body on square ( ) laugh on square ( ) press square ( ) touch square ( ) blow square ( )
Consolidation: # 29 Twister

APPENDIX C1. BEAP 2003 Action Group's Learning Tasks (A Typical Session)

Learning Task #31 Simon Says	
Input model:	**Action**
Learning objective(s):	• To learn some simple action verbs • To learn to give and follow simple instructions
Introduction/consolidation/both	• Introduction (stand , sit, go, open, close, come, talk, run, jump, squat, crawl, smile, laugh)
Prerequisite:	--
Grouping (no. of students per group):	A whole-class activity
Procedure:	1. Clear a space in the classroom. The members stand facing you in a large semi-circle with enough space to move around comfortably. 2. Revise the *action verbs*/ vocabulary needed for the task. 3. Call out a command such as "Simon says, sit down". 4. The members have to follow your command but should remain motionless if you do not precede the commands with "Simon says". 5. Members who get this wrong must sit down. The one remains standing at the end is the winner. Variation(s) Invite students to be "Simon" when they are familiar with the game.
Duration:	30 minutes
Equipment/ materials:	• Seats • Books
Appropriate site:	Classroom

Learning Task #13 My Birthday Party	
Input model:	**Action**
Learning objective(s):	• To learn some action verbs related to a familiar scene
Introduction/consolidation/both	• Introduction (greet, play, sing, make, blow, clap, cut, open, eat) • Names of objects found in a birthday party
Prerequisite:	--
Grouping (no. of students per group):	Individual Work + Pair Work
Procedure:	1. The teacher is to read out a passage about a birthday party and use some time to explain it. 2. The passage comprises five to six sentences describing what happens during the occasion, as shown below: • My friends ***greet*** me. • We ***play*** games. • We ***sing*** "Happy Birthday" • I ***make*** a wish. • I ***blow out*** the candles • We ***clap*** hands. • I ***cut*** the cake. • We ***eat*** the cake. • I ***open*** the presents. 3. Write the above sentences on the board. 4. Ask students to imagine what they will do in their own birthday party. Choose any four sentences from the board and draw a picture for each of them on the task sheet provided. 5. After that, they are to get into pairs and describe the pictures to their partners, using the action verbs/phrases/ sentences mentioned in the passage.
Duration:	30 minutes
Equipment/ materials:	• Task Sheets • Color pencils
Appropriate site:	Classroom

Learning Task #38 Noughts and Crosses	
Input model:	**Action**
Learning objective(s):	• To reinforce the action verbs learnt in other sessions • To learn to respond to instructions
Introduction/consolidation/both	Consolidation
Prerequisite:	--
Grouping (no. of students per group):	2(5-5)
Procedure:	1. Divide the members into two teams of five. 2. Draw a large noughts and crosses grid (5x5 squares) on the board. All the squares are numbered and represent different actions. 3. Start the game. A member from one of the teams chooses a square. 4. The teacher reads out the command associated with the square, e.g. "*Stand* on one foot". 5. If the member performs it correctly, he or she can put a cross on the square. 6. The two teams take turns to choose squares and perform actions. One team uses noughts while the other team uses crosses. 7. The aim of this game is to get a row of three noughts or crosses in any direction. 8. The first team getting a row of six noughts or crosses in any directions wins.
Duration:	30 minutes
Equipment/ materials:	A large grid with 36 squares on them
Appropriate site:	Classroom

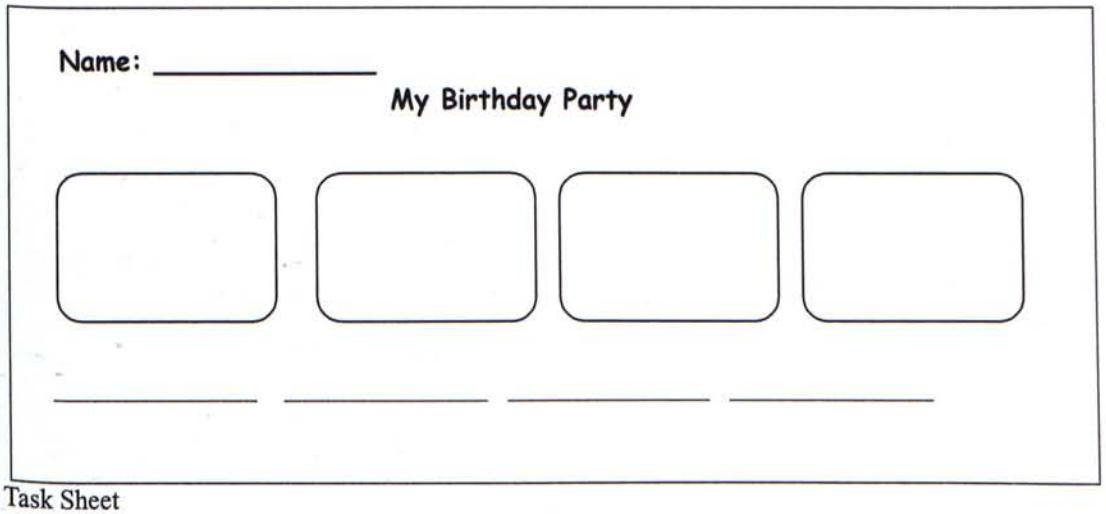
APPENDIX C2. BEAP 2003 Picture Group's Learning Tasks (A Typical Session)

Learning Task #16 Body Movements	
Input model:	**Picture**
Learning objective(s):	• To learn some simple action verbs related to body movements
Introduction/consolidation/both	• Introduction (stand (up), sit (down), open, close, come, talk, run, jump, squat, crawl, smile, laugh)
Prerequisite:	--
Grouping (no. of students per group):	2 (5-5)
Procedure:	1. Introduce the following action verbs by using action verb cards and pictures. 2. Read out the verbs together for a few times. 3. Divide the students into two groups. Each group has a teaching assistant as the facilitator. 4. Put two body shape cards (front & back) on the desk. 5. One by one, students get a card randomly from the teacher. First, they have to read out the action verb, then they stick the card on the body part that is responsible for that action.
Duration:	30 minutes
Equipment/ materials:	• Action verb cards • Pictures • 2 large body shape cards (front and back) (2 sets)
Appropriate site:	Classroom

(Ref: Action Group #31)

Learning Task #14 My Birthday Party	
Input model:	**Picture**
Learning objective(s):	• To learn some action verbs related to a familiar scene
Introduction/consolidation/both	• Introduction (greet, play, sing, make, blow, clap, cut, open, eat) • Names of objects found in birthday party
Prerequisite:	--
Grouping (no. of students per group):	Individual Work
Procedure:	1. Introduce some action verbs related to the scene of a birthday party. Show a corresponding picture as you read out each of the following sentences. • My friends *greet* me. • We *play* games. • We *sing* "Happy Birthday" • I *make* a wish. • I *blow out* the candles • We *clap* hands. • I *cut* the cake. • We *eat* the cake. • I *open* the presents. 2. Ask students to choose any four sentences from the board and draw a picture for each of them on the task sheet provided. 3. After that, they are to get into pairs and describe the pictures to their partners, using the action verbs/ phrases/ sentences they just learnt.
Duration:	30 minutes
Equipment/ materials:	• Picture cards • Task Sheets
Appropriate site:	Classroom

(Ref.: Action Group #13)



Task Sheet

Learning Task #20 Noughts and Crosses	
Input model:	**Picture**
Learning objective(s):	• To reinforce the learning of action verbs learnt in other sessions
Introduction/consolidation/both	Consolidation
Prerequisite:	--
Grouping (no. of students per group):	2(5-5)
Procedure:	1. Divide the members into two teams. 2. Draw a large noughts and crosses grid (5x5 squares) on the board. All the squares are numbered. 3. Start the game. A member from one of the teams chooses a square. 4. The teacher then shows the numbered picture, the member has to describe it using an appropriate action verb. 5. If the member says it correctly, he or she can put a cross on the square. 6. The two teams take turns to choose squares and describe actions. One team uses noughts while another team uses crosses. 7. The aim of this game is to get a row of 5 noughts or crosses in any direction. 8. The first team getting a row of six noughts or crosses in any direction wins.
Duration:	30 minutes
Equipment/ materials:	• A large grid with 25 squares on them • 25 pictures
Appropriate site:	Classroom

(Ref: Action Group #38)

APPENDIX D1. Pre-test of the First Study

Name: _____ Date: _____
Time limit: 25 minutes

Part 1: Matching. 第一部份： 配對。

A) Match the action verbs with the pictures (not available in this sample).

甲) 請將動詞和其相關圖畫作配對，把答案填在橫線上。

barbecue	pull	greet	hug	lick

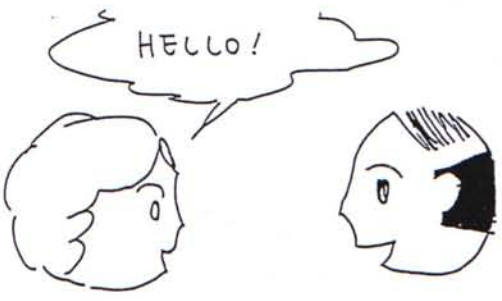
e.g.

_____ run _____

1.

_____

2.



_____

3.

_____

4.

_____

5.

_____

B) Match some objects and things with their common usage.

乙) 請將下列物件和其用處作配對，把答案填在橫線上。

e.g. fork ___eat___

1. cutter _____	A. ride
2. telephone _____	B. cut
3. comb _____	C. dial
4. cup _____	D. iron
5. iron _____	E. cook
6. pan _____	F. comb
7. pen _____	G. drink
8. bicycle _____	H. buy
9. money _____	I. write

Part 2: Fill in the blanks. Choose the best answer from the list below.

第二部份： 填充。請把最適當的答案填在橫線上。

brush	faint	clap	bark	flap	shake

e.g. John ___goes___ to school every day.

1. The dogs _____ and the cats meow.

2. I _____ my teeth every day.

3. We _____ hands while we are singing.

4. Mary and Jenny _____ away after seeing a snake and an insect.

5. Birds _____ their wings to fly up high in the sky.

6. Add some salt and _____ the French-fries.

Part 3: Multiple Choice. 第三部份： 選擇題。

Circle the <u>best</u> answer. 請圈出<u>最適當</u>的答案。

e.g. I _____ egg and bread every morning.

(a) eat b) drink c) fall

1. I _____ with my dog every day.

a) play b) get c) do

2. Please _____ your English name on the paper.

a) cut b) write c) wash

3. The baby is going to sleep. She _____ all the time!

a) yawns b) smiles c) blows

4. Let's do some exercise! Let's _____ our body and bend our knees.

a) ask b) stomp c) twist

5. Jane _____ with her friends after school.

a) breaks b) talks c) wave

6. Can you _____ the good taste of the pizza?

a) watch b) smell c) eat

7. The little brother fights with his brother. He _____ his brother's face.

a) slaps b) hugs c) talks

8. Jack and I _____ homework together after school.

a) do b) plant c) push

9. I _____ my English teacher some questions and she answers me.

a) crawl b) touch c) ask

10. Don't _____ on the ground! Stand up!

a) get b) greet c) squat

~ The end of the paper ~

APPENDIX D2. Post-test of the First Study

Name: _____ Date: _____
Time limit: 25 minutes

Part 1: Matching. 第一部份： 配對。

A) Match the action verbs with the pictures.

甲) 請將動詞和其相關圖畫作配對，把答案填在橫線上。

run	barbecue	greet	pull	lick	hug

e.g.

_____ run _____

1.

_____

2.

_____

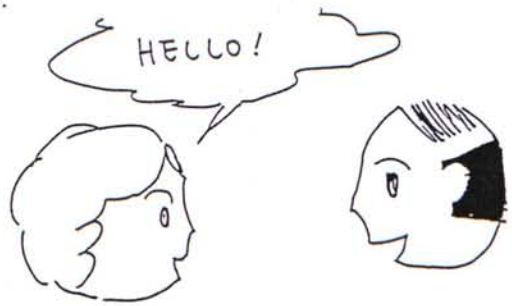
3.

_____

4.

_____

5.



_____

B) Match some objects and things with their common usage.

乙) 請將下列物件和其用處作配對，把答案填在橫線上。

e.g. fork ___A

1. cutter _____
2. telephone _____
3. comb _____
4. cup _____
5. iron _____
6. pan _____
7. pen _____
8. bicycle _____
9. money _____

A. eat

B. cut

C. dial

D. iron

E. ride

F. comb

G. cook

H. buy

I. drink

J. write

Part 2: Fill in the blanks. Choose the best answer from the list below.

第二部份：填充。請把最適當的答案填在橫線上。

brush	faint	clap	bark	flap	shake

e.g. John ____goes____ to school every day.

1. In McDonalds, we add some salt and _____ the French-fries.
2. Mary and Jenny fall down and _____ away after dancing.
3. Let's _____ our teeth before we wash our face.
4. We _____ hands and we sing songs.
5. The cats meow and the dogs _____.
6. Birds _____ their wings to fly in the sky, but fishes swim in the sea.

Part 3: Multiple Choice. 第三部份： 選擇題。

Circle the <u>best</u> answer. 請圈出<u>最適當</u>的答案。

e.g. I _____ eggs and bread every morning.

(a) eat b) drink c) fall

1. I _____ with my cat every day.

a) play b) get c) do

2. Stand up! Don't _____ on the ground!

a) get b) greet c) squat

3. Please _____ down your name on the book.

a) cut b) write c) wash

4. Let's do some exercise! Let's _____ our body and turn around.

a) ask b) stomp c) twist

5. Mary is going to sleep. She _____ all the time!

a) yawns b) smiles c) blows

6. Jenny _____ with her friends after school.

a) breaks b) talks c) wave

7. The little boy _____ his brother's face and they fight with each other.

a) slaps b) hugs c) talks

8. Can you _____ the good taste of the chicken legs?

a) watch b) smell c) eat

9. Jim and I _____ homework together after school.

a) do b) plant c) push

10. We _____ my English teacher some questions and she answers us back.

a) crawl b) touch c) ask

Part 4: Put the words in the right order (this part was not counted into the results of the post-test).

第四部份：重組句子

e.g. goes/ he/ to/ every day/ school/ .

He goes to school every day .

1. read/ the boy and the girl/ books/ every afternoon/ .

_____

2. Jack/ every day/ ball/ plays/ .

_____

~ The end of the paper ~

Appendix E. Post-program Questionnaire of the First Study

Name: _____ Date: _____

Group: _____

Part 1: Evaluating student's learning English as a foreign language.

Tick one box in each question.

a) Speaking

1. Were you willing to speak English in front of other people before joining the English language program? 你參加此課程前會否願意與別人說英文?

☐ very willing十分願意 ☐ willing願意 ☐ fairly willing一般願意☐

not very willing不太願意 ☐ not willing不願意

2. Are you willing to speak English in front of other people now after the English language program? 你在參加了此課程後願不願意與別人說英文？

☐ very willing十分願意 ☐ willing願意 ☐ fairly willing一般願意☐

not very willing不太願意 ☐ not willing不願意

3. What was the volume of your voice when you speak English before joining the English language program? 你在參加此課程前講英文的聲量如何？

☐ very loud十分響亮 ☐ loud響亮 ☐ fairly loud一般響亮

☐ not very loud不太響亮 ☐ not loud不響亮

4. What is the volume of your voice when you speak English now after the English language program? 你在參加此課程後講英文的聲量如何？

☐ very loud十分響亮　☐ loud響亮　☐ fairly loud一般響亮

☐ not very loud不太響亮　☐ not loud不響亮

b) Listening聆聽

1. How well did you listen to the English language before joining the English language program? 你在參加此課程前，對英文的聆聽能力如何？

☐ very well十分好　☐ well好　☐ fairly well一般

☐ not very well不太好　☐ not well不好

2. How well do you listen to the English language now after the English language program? 你在參加此課程後，對英文的聆聽能力如何？

☐ very well十分好　☐ well好　☐ fairly well一般

☐ not very well不太好　☐ not well不好

c) Learning attitudes學習態度

1. What did you think of English before joining the English language program? 你在參加此課程前對英文的印象如何?

(You may tick more than one box.)可選多於一項

☐ interesting	有趣	☐ boring	沉悶
☐ easy	容易	☐ difficult	困難
☐ useful	有用	☐ useless	無用

2. What do you think of English now after the English language program?

你在參加此課程後對英文的印象如何?

(You may tick <u>more than one</u> box.)可選多於一項

☐ interesting	有趣	☐ boring	沉悶
☐ easy	容易	☐ difficult	困難
☐ useful	有用	☐ useless	無用

3. Did you like to learn English <u>before</u> joining the English language program?

你在參加此課程前喜歡學習英文嗎?

☐ very much十分喜歡 ☐ quite like頗喜歡 ☐ fairly like一般喜歡

☐ not very much不太喜歡 ☐ totally not完全不喜歡

4. Do you like to learn English now <u>after</u> the English language program?

你在參加此課程後喜歡學習英文嗎?

☐ very much十分喜歡 ☐ quite like頗喜歡 ☐ fairly like一般喜歡

☐ not very much不太喜歡 ☐ totally not完全不喜歡

5. What was your confidence level of learning English <u>before</u> joining the English language program? 參加此課程前你對於學習英文的信心如何?

☐ very high很高 ☐ high高 ☐ fairly high一般

☐ not very high不太高 ☐ not high不高

\

6. What is your confidence level of learning English now after the English language program? 參加此課程後你對於學習英文的信心如何?

☐ very high很高 ☐ high高 ☐ fairly high一般

☐ not very high不太高 ☐ not high不高

Part 2: Overall evaluation of the English language program.

1. How much have you learnt in this English language program?

你在這課程中學習了多少?

☐ a lot很多 ☐ quite a lot頗多 ☐ a fair amount一般

☐ not very much不太多 ☐ not much不多

2. Do you find yourself actively participate in the learning tasks?

你覺得自己在學習過程中參與積極嗎?

☐ always經常 ☐ quite often頗經常 ☐ sometimes有時

☐ seldom很少 ☐ never從不

3. Did you like to learn action verbs in this English language program?

你喜歡在這課程中學習動詞嗎?

☐ very much十分 ☐ quite like頗喜歡 ☐ fairly like一般喜歡

☐ not very much不太喜歡 ☐ totally not 完全不喜歡

4. What do you like about this English language program? 你最喜歡這個課程的哪些方面?

(You may tick <u>more than one</u> box.)可選多於一項

☐ learning activities 學習活動
☐ teaching content 教學內容
☐ teaching materials 教具
☐ classmates 同學
☐ teaching method 教學方法
☐ teacher and teaching assistants教師及助教
☐ awards (e.g. candies and stickers)獎品
☐ others 其他 (e.g. 如_____)

5. What caused some difficulty for you to learn English in this English language program?在此課程中有什麼阻礙你學習英文呢?

(You may tick <u>more than one</u> box.)可選多於一項

☐ instructions of the learning activities 學習活動的指令
☐ teaching content 教學內容
☐ teaching materials教學材料
☐ teaching method教學方法
☐ classmates 同學
☐ teacher and teaching assistants教師及助教
☐ others其他 (如e.g. _____)

6. Which is/ are the <u>most</u> memorable activity(ies) in this English language program?在此課程中你印象最深刻的是哪一(些)活動?

_____

7. How were the teacher and teaching assistants teaching English in this English language program? 你覺得在此課程中的老師和助教如何?

☐ very good十分好
☐ good好
☐ fairly good一般
☐ not very good不太好
☐ not good不好

8. Do you like this English language program? 你喜歡此課程嗎?

☐ very much十分喜歡 ☐ quite頗喜歡 ☐ alright還可以

☐ not very much不太喜歡 ☐ totally not完全不喜歡

9. Would you join this English language program in the future if you have given the chance? 以後如果有機會, 你還會再參加此課程嗎?

☐ Yes會 (Why?原因:_____

)

☐ No不會 (Why?原因:_____)

~ The end of the questionnaire ~

APPENDIX F1. BEAP 2003 Timetable of the Action Group

Session 1	
9:00a.m. - 9:30a.m.	Pre-test
	Orientation & Welcome of the Participants
9:30a.m. - 10:00a.m.	#31 Simon Says
10:00a.m. - 10:30a.m.	#13 My Birthday Party
Session 2	
9:00a.m. - 9:30a.m.	#38 Noughts and Crosses
9:30a.m. - 10:00a.m.	#45 Fun with Action Verbs
10:00a.m. - 10:30a.m.	#5 Helping a Martian
Session 3	
9:00a.m. - 9:30a.m.	#6 Teaching a Martian
9:30a.m. - 10:00a.m.	#27 What is It?
10:00a.m. - 10:30a.m.	#24 Decode the Secret Message
Session 4	
9:00a.m. - 9:30a.m.	#48 Fun Matching
9:30a.m. - 10:00a.m.	#19 My Timetable
10:00a.m. - 10:30a.m.	#41 Let's Dance
Session 5	
9:00a.m. - 9:30a.m.	#12 Wild Sentences
9:30a.m. - 10:00a.m.	#18 True or False?
10:00a.m. - 10:30a.m.	#23My Job
Session 6	
9:00a.m. - 9:30a.m.	#43 The Hammer Game
9:30a.m. - 10:00a.m.	#33 Ring and Act
10:00a.m. - 10:30a.m.	#37 Obstacle Race
Session 7	
9:00a.m. - 9:30a.m.	#1 Buddy and Cassy
9:30a.m. - 10:00a.m.	#3 My Dog & I
	#2 In the Park
10:00a.m. - 10:30a.m.	#39 Neighbours
Session 8	
9:00a.m. - 10:00a.m.	# 34 Pictionary
	#36 Pass the Hat! Pass the bag!
	#57 Slam the Dummies
10:00a.m. - 10:30a.m.	# 44 Guesstures
Session 9	
9:00a.m. - 9:30a.m.	#1 Living Sentences
9:30a.m. - 10:00a.m.	#4 Matching Cards
10:00a.m. - 10:30a.m.	#29 Cartoon Time (Toy Story II)
Session 10	
9:00a.m. - 9:30a.m.	#14 Complete the Story
9:30a.m. - 10:00a.m.	#35 Pass the Message
10:00a.m. - 10:30a.m.	#29 Twister
10:00a.m. - 10:30a.m.	Post-test

APPENDIX F2. BEAP 2003 Timetable of the Picture Group

Session 1	
11:00a.m. - 11:30a.m.	Pre-test
	Orientation & Welcome of the Participants
11:30a.m. - 12:00a.m.	#16 Body Movements
12:00a.m. - 12:30p.m.	#14 My Birthday Party
Session 2	
11:00a.m. - 11:30a.m.	#20 Noughts and Crosses
11:30a.m. - 12:00a.m.	#3 Fun with Action Verbs
12:00a.m. - 12:30p.m.	#6 Helping a Martian
Session 3	
11:00a.m. - 11:30a.m.	#19 Teaching a Martian
11:30a.m. - 12:00a.m.	#11 Cut and Paste
12:00a.m. - 12:30a.m.	#21 Decode the Secret Message
Session 4	
11:00a.m. - 11:30a.m.	#2 Fun Matching
11:30a.m. - 12:00a.m.	#15 My Timetable
12:00a.m. - 12:30p.m.	#17 Dance Steps
Session 5	
11:00a.m. - 11:30a.m.	#29 Wild Sentences
11:30a.m. - 12:00a.m.	#31 Right or Wrong
12:00a.m. - 12:30p.m.	#27 My Job
Session 6	
11:00a.m. - 11:30a.m.	#23 Get the Right Picture
11:30a.m. - 12:00a.m.	#22 Ring the Word
12:00a.m. - 12:30p.m.	#24 In the Playground
Session 7	
11:00a.m. - 11:30a.m.	#7 Animal World
11:30a.m. - 12:00a.m.	#5 I and my Dog
	#4 In the Park
12:00a.m. - 12:30p.m.	#1 Spot the differences!
Session 8	
11:00a.m. - 12:00a.m.	#10 Perfect Match
	#9 Pass the Hat! Pass the bag!
	#12 Guesstures
12:00a.m. - 12:30p.m.	#18 Quiz Time
Session 9	
11:00a.m. - 11:30a.m.	#25 Living Sentences
11:30a.m. - 12:00a.m.	#28 Matching Cards
12:00a.m. - 12:30p.m.	#26 Cartoon Time
Session 10	
11:00a.m. - 11:30a.m.	#30 Complete the Story
11:30a.m. - 12:00a.m.	#8 Pass the Message
	#13 Shout it Out
12:00a.m. - 12:30p.m.	Post-test

APPENDIX G1. Results of Pre- and Post-tests of the First Study

Table 1. Independent-samples T-test on Total Pre-test Mean Scores for the Action Group and Picture Group

	GROUP	N	**Mean**	Std. Deviation	Std. Error Mean
Pre-test score	**group 1**	13	9.0769	2.90004	.80433
	group 2	11	9.6364	3.50065	1.05549

Note. Group 1 represents Action Group; group 2 represents Picture Group

		t-test for Equality of Means						
		t	df	**Sig. (2-tailed)**	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Pre-test score	Equal variances assumed	-.428	22	.672	-.5594	1.30567	-3.26724	2.14836
	Equal variances not assumed	-.422	19.505	.678	-.5594	1.32702	-3.33207	2.21319

Note. Levene's test for equality of variance is not shown in the chart

Table 2. Independent-samples T-tests on Pre-test Mean Scores of Part 1 A, 1 B, 2, and 3 for the Action Group and the Picture Group

		t-test for Equality of Means						
		t	df	**Sig. (2-tailed)**	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Pre-test part 1A	Equal variances assumed	-.994	22	.331	-.5944	.59785	-1.83428	.64547
	Equal variances not assumed	-.975	19.073	.342	-.5944	.60951	-1.86979	.68098
Pre-test part 1B	Equal variances assumed	-.098	22	.923	-.0839	.85559	-1.85831	1.69047
	Equal variances not assumed	-.096	19.479	.924	-.0839	.86975	-1.90129	1.73346
Pre-test part 2	Equal variances assumed	.106	22	.917	.0490	.46171	-.90858	1.00648
	Equal variances not assumed	.107	21.794	.916	.0490	.45861	-.90267	1.00057
Pre-test part 3	Equal variances assumed	.134	22	.895	.0699	.52263	-1.01394	1.15380
	Equal variances not assumed	.134	21.152	.895	.0699	.52379	-1.01887	1.15873

Note. Levene's test for equality of variance is not shown in the chart

Table 3. Independent-samples T-test on Total Post-test Mean Scores for the Action Group and Picture Group

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
Post-test score	**group 1**	13	15.5385	5.36370	1.48762
	group 2	11	15.0909	4.54873	1.37149

Note. Group 1 represents Action Group; group 2 represents Picture Group

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Post-test score	Equal variances assumed	.218	22	.829	.4476	2.05235	-3.80875	4.70386
	Equal variances not assumed	.221	21.998	.827	.4476	2.02337	-3.74868	4.64378

Note. Levene's test for equality of variance is not shown in the chart

Table 4. Independent-samples T-tests on Post-test Mean Scores of Part 1 A, 1 B, 2, and 3 for the Action Group and the Picture Group

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Post-test part 1A	Equal variances assumed	-1.739	22	.096	-.6923	.39805	-1.51781	.13320
	Equal variances not assumed	-1.897	12.000	.082	-.6923	.36488	-1.48731	.10269
Post-test part 1B	Equal variances assumed	-.691	22	.497	-.6993	1.01265	-2.79940	1.40080
	Equal variances not assumed	-.700	21.995	.491	-.6993	.99882	-2.77076	1.37216
Post-test part 2	Equal variances assumed	1.306	22	.205	.9790	.74943	-.57520	2.53324
	Equal variances not assumed	1.328	21.991	.198	.9790	.73695	-.54936	2.50740
Post-test part 3	Equal variances assumed	1.201	22	.242	.8601	.71609	-.62493	2.34521
	Equal variances not assumed	1.206	21.660	.241	.8601	.71300	-.61988	2.34016

Note. Levene's test for equality of variance is not shown in the chart

Table 5. Paired-samples T-test on Pre- and Post-test Mean Scores for the Action Group

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test score	9.0769	13	2.90004	.80433
	Post-test score	15.5385	13	5.36370	1.48762

Note: pair 1 indicates the two variables of the Action Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	**Pre-test score - Post-test score**	-6.4615	5.44082	1.50901	-9.7494	-3.1737	-4.282	12	.001

Table 6. Paired-samples T-test on Pre- and Post-test Mean Scores for the Picture Group

		Mean	N	Std. Deviation	Std. Error Mean
Pair 2	Pre-test score	9.6364	11	3.50065	1.05549
	Post-test score	15.0909	11	4.54873	1.37149

Note: pair 2 indicates the two variables of the Picture Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 2	**Pre-test score - Post-test score**	-5.4545	4.08323	1.23114	-8.1977	-2.7114	-4.430	10	.001

APPENDIX G2. Questionnaire Results of the First Study

Table 1. Means Scores of Questionnaire Items Concerning Subjects' Perceived English Abilities

GROUP		Before the BEAP Volume of Speaking	After the BEAP Volume of Speaking	Before the BEAP Listening Ability	After the BEAP Listening Ability
Action Group	Mean	2.85	2.67	2.25	2.31
	N	13	12	12	13
	Std. Deviation	1.345	1.371	.866	1.109
Picture Group	Mean	2.45	2.64	2.27	2.20
	N	11	11	11	10
	Std. Deviation	1.214	1.362	.786	1.549
Total	Mean	2.67	2.65	2.26	2.26
	N	24	23	23	23
	Std. Deviation	1.274	1.335	.810	1.287

Note: Some data are missing.

Table 2. Paired-samples T-test on Mean Scores of Subjects' Perceived English Abilities for the Action Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Speaking-volume of voice - Speaking-volume of voice	.08	1.564	.452	-.91	1.08	.185	11	.857
Pair 2	Listening ability - Listening ability	.00	1.128	.326	-.72	.72	.000	11	1.000

Table 3. Paired-samples T-test on Mean Scores of Subjects' Perceived English Abilities for the Picture Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Speaking-volume of voice - Speaking-volume of voice	-.18	1.537	.464	-1.21	.85	-.392	10	.703
Pair 2	Listening ability - Listening ability	.00	1.155	.365	-.83	.83	.000	9	1.000

Table 4. Means Scores of Questionnaire Items Concerning Subjects' Attitudes towards English (Learning)

GROUP		Before the BEAP: Willingness of Speaking English	After the BEAP: Willingness of Speaking English	Before the BEAP: Fondness of English Learning	After the BEAP: Fondness of English Learning	Before the BEAP: Confidence Level of Learning English	After the BEAP: Confidence Level of Learning English
Action Group	Mean	3.69	3.00	2.33	2.54	2.54	2.15
	N	13	13	12	13	13	13
	Std. Deviation	1.182	1.581	1.231	1.330	.967	1.144
Picture Group	Mean	3.55	3.82	3.73	2.55	2.91	2.82
	N	11	11	11	11	11	11
	Std. Deviation	1.508	1.328	1.348	1.440	1.136	1.328
Total	Mean	3.63	3.37	3.00	2.54	2.71	2.46
	N	24	24	23	24	24	24
	Std. Deviation	1.313	1.498	1.446	1.351	1.042	1.250

Note: Some data are missing.

Table 5. Paired-samples T-test on Mean Scores of Subjects' Attitudes towards English (Learning) for the Action Group

		Paired Differences: Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference: Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	willingness to speak English - willingness to speak English	.69	1.182	.328	-.02	1.41	2.112	12	.056
Pair 2	fondness of English - fondness of English	-.25	1.138	.329	-.97	.47	-.761	11	.463
Pair 3	confidence level of learning English - confidence level of learning English	.38	1.193	.331	-.34	1.11	1.162	12	.268

Table 6. Paired-samples T-test on Mean Scores of Subjects' Attitudes towards English (Learning) for the Picture Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	willingness to speak English - willingness to speak English	-.27	1.849	.557	-1.51	.97	-.489	10	.635
Pair 2	fondness of English - fondness of English	1.18	1.328	.400	.29	2.07	2.951	10	.014
Pair 3	confidence level of learning English - confidence level of learning English	.09	1.221	.368	-.73	.91	.247	10	.810

Table 7. Means Scores of Questionnaire Items Concerning Subjects' Views on English before the BEAPs

GROUP		Interesting	Easy	Useful	Boring	Difficult	Useless
	Mean	.38	.31	.38	.15	.31	.31
	N	13	13	13	13	13	13
	Std. Deviation	.506	.480	.506	.376	.480	.480
	Mean	.27	.09	.55	.27	.45	.27
	N	11	11	11	11	11	11
	Std. Deviation	.467	.302	.522	.467	.522	.467
	Mean	.33	.21	.46	.21	.38	.29
	N	24	24	24	24	24	24
	Std. Deviation	.482	.415	.509	.415	.495	.464

Table 8. Means Scores of Questionnaire Items Concerning Subjects' Views on English after the BEAPs

GROUP		Interesting	Easy	Useful	Boring	Difficult	Useless
	Mean	.58	.31	.38	.08	.23	.15
	N	12	13	13	13	13	13
	Std. Deviation	.515	.480	.506	.277	.439	.376
	Mean	.55	.73	.36	.09	.09	.18
	N	11	11	11	11	11	11
	Std. Deviation	.522	.467	.505	.302	.302	.405
	Mean	.57	.50	.38	.08	.17	.17
	N	23	24	24	24	24	24
	Std. Deviation	.507	.511	.495	.282	.381	.381

Note: Some datum is missing.

Table 9. Paired-samples T-test on Pre- and Post-program Mean Scores of the Subjects' Views on English for the Action Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Interesting - Interesting	-.17	.577	.167	-.53	.20	-1.000	11	.339
Pair 2	Easy - Easy	.00	.707	.196	-.43	.43	.000	12	1.000
Pair 3	Useful - Useful	.00	.408	.113	-.25	.25	.000	12	1.000
Pair 4	Boring - Boring	.08	.277	.077	-.09	.24	1.000	12	.337
Pair 5	Difficult - Difficult	.08	.494	.137	-.22	.38	.562	12	.584
Pair 6	Useless - Useless	.15	.376	.104	-.07	.38	1.477	12	.165

Table 10. Paired-samples T-test on Pre- and Post-program Mean Scores of the Subjects' Views on English for the Picture Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Interesting - Interesting	-.27	.647	.195	-.71	.16	-1.399	10	.192
Pair 2	Easy - Easy	-.64	.505	.152	-.98	-.30	-4.183	10	.002
Pair 3	Useful - Useful	.18	.603	.182	-.22	.59	1.000	10	.341
Pair 4	Boring - Boring	.18	.405	.122	-.09	.45	1.491	10	.167
Pair 5	Difficult - Difficult	.36	.505	.152	.02	.70	2.390	10	.038
Pair 6	Useless - Useless	.09	.302	.091	-.11	.29	1.000	10	.341

Table 11. Means Scores of Questionnaire Items Concerning Subjects' Evaluation of the BEAPs

GROUP		Knowledge gained in the program	Interest in Learning Action Verbs	Participation in the BEAP	Satisfaction of the Teacher and the TAs	Satisfaction of the BEAP	Future Enrollment of the BEAP (1:Yes; 2: No)
Action Group	Mean	1.92	2.46	2.46	1.67	2.00	1.38
	N	13	13	13	12	13	13
	Std. Deviation	1.441	1.391	1.391	.778	1.291	.506
Picture Group	Mean	3.09	2.18	2.73	2.18	2.00	1.40
	N	11	11	11	11	11	10
	Std. Deviation	1.221	1.722	.786	1.250	1.265	.516
Total	Mean	2.46	2.33	2.58	1.91	2.00	1.39
	N	24	24	24	23	24	23
	Std. Deviation	1.444	1.523	1.139	1.041	1.251	.499

Note: Some data are missing.

Table 12. Means Scores of Questionnaire Items Concerning Subjects' Like about the Programs

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
Learning activities	Action Group	13	.69	.480	.133
	Picture Group	11	.55	.522	.157
Teaching content	Action Group	13	.08	.277	.077
	Picture Group	11	.27	.467	.141
Teaching materials	Action Group	13	.08	.277	.077
	Picture Group	11	.18	.405	.122
Classmates	Action Group	13	.31	.480	.133
	Picture Group	11	.36	.505	.152
Teaching method	Action Group	13	.38	.506	.140
	Picture Group	11	.45	.522	.157
Teacher and teaching assistants	Action Group	13	.31	.480	.133
	Picture Group	11	.18	.405	.122
Awards	Action Group	13	.15	.376	.104
	Picture Group	11	.36	.505	.152
Others	Action Group	13	.00	.000(a)	.000
	Picture Group	11	.00	.000(a)	.000

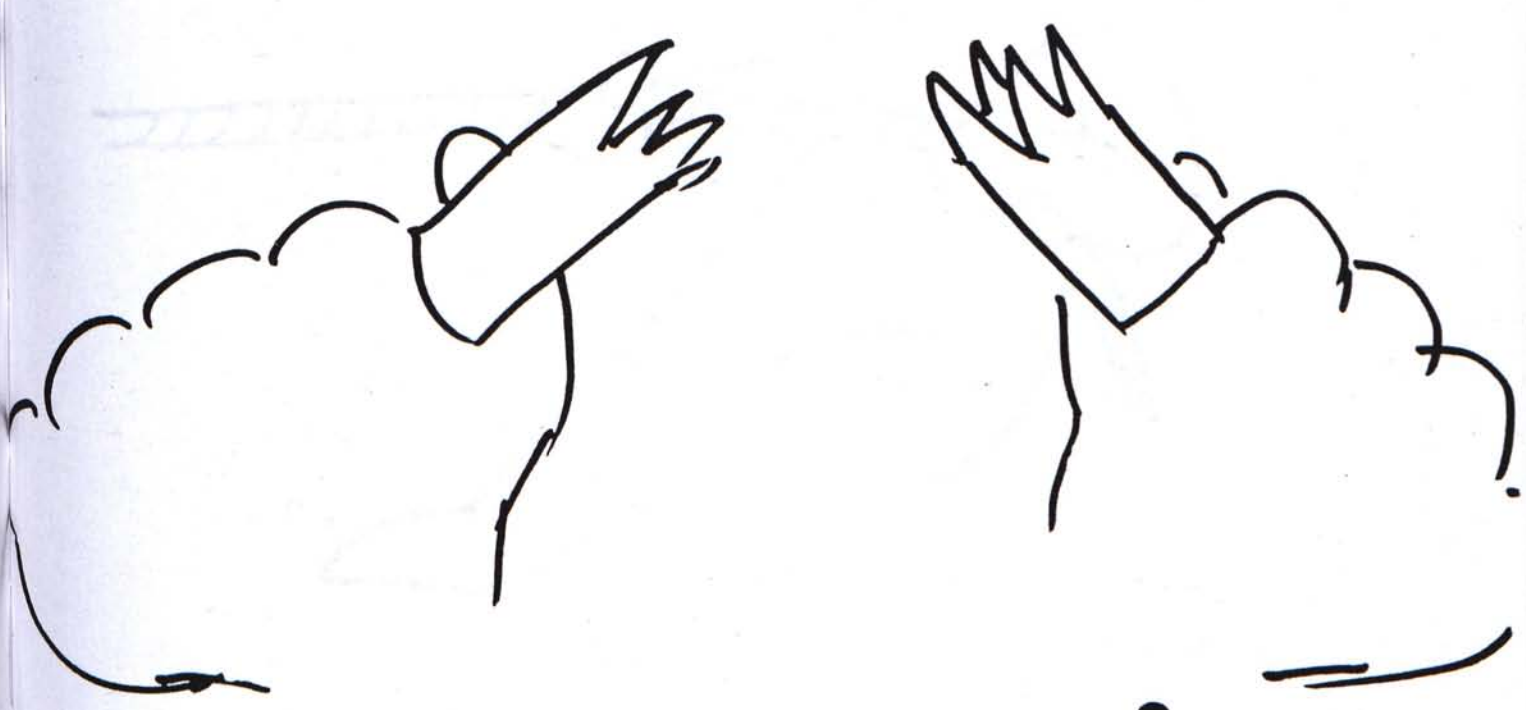
Table 13. Means Scores of Questionnaire Items Concerning Subjects' Perceived Source of Difficulties in the Program

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
Instruction of the learning activities	Action Group	13	.08	.277	.077
	Picture Group	11	.18	.405	.122
Teaching content	Action Group	13	.23	.439	.122
	Picture Group	11	.00	.000	.000
Teaching materials	Action Group	13	.31	.480	.133
	Picture Group	11	.18	.405	.122
Classmates	Action Group	13	.08	.277	.077
	Picture Group	11	.09	.302	.091
Teaching method	Action Group	13	.23	.439	.122
	Picture Group	11	.18	.405	.122
Teacher and teaching assistants	Action Group	13	.00	.000	.000
	Picture Group	11	.18	.405	.122
Others	Action Group	13	.31	.480	.133
	Picture Group	11	.36	.505	.152

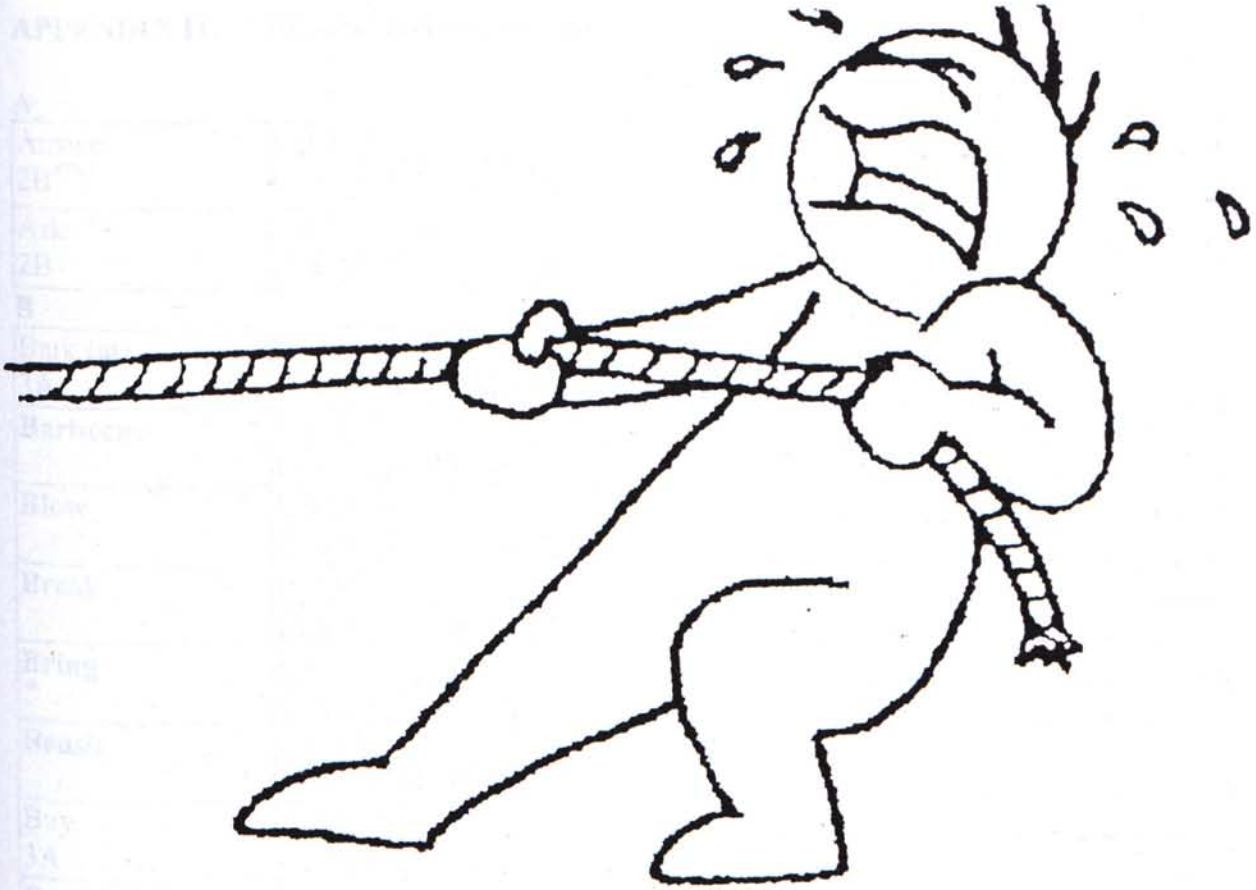
APPENDIX H. BEAPs 2003 Action Verb Picture Cards (Samples)

squat

draw



break



pull

APPENDIX I1. BEAPs 2004 Action Verb List

A

Answer 2B[8]	I: # 3 C: # 39, 36, 02, 03, 04
Ask 2B	I: # 3 C: # 39, 36, 02, 03, 04

B

Bark (at) 3A	I: # 1 C: # 37, 43, 36, 06, 08
Barbecue	I: #48, 2 C: # 33,34, 39, 36, 06, 08
Blow	I: # 13, 48 C: # 38, 45, 33, 34, 05, 08
Break	I: # 48, 2 C: # 33, 34, 39, 36, 05, 08
Bring	I: # 2 C: # 39, 36, 06, 08
Brush	I: # 19 C: # 33, 34, 02, 03, 04
Buy 3A	I: # 6, 48 C: # 24, 27, 33, 34, 01, 05, 08
Bathe	I: #48, 19 C: # 33, 34, 04, 06, 08
Bow	I: # 5 C: # 24, 27, 02, 03, 04
Bump	I: # 2, 3 C: # 39, 36, 06, 08

C

Clap 2B	I: # 13, 41, 1 C: # 38, 45, 37, 43, 01, 05, 08
Clean 1A	I: # 6 C: # 24, 27, 01, 02, 03, 04
Climb 3A	I: # 1 C: # 37, 43, 02, 03, 04
Close 2B	I: #31 C:#38, 45, (37), 06, 08
Comb	I: # 6, 19 C: # 24, 27, 33, 34, 36
Come 3A	I: # 31, 19 C: # 38, 45, (37), 33, 34
Cook 3A	I: # 6, 48 C: # 24, 27, 33, 34, 36, 01, 05, 08
Crawl	I: # 31, 41 C: # 38, 45, 37,43

[8] The serial number of the text-book: the verb is marked with the number when the verb was found to appear for the first time in the text of Integrated Primary English (TOC edition), starting from 3A to 1A.

Cut 1B	I: # 13, 6 C: # 38, 45, 24, 27, 36, 01
Chase	I: # 2, 3, 48 C: # 33, 34, 39, 36, 04, 06, 08

D

Dance 3A	I: # 3 C: # 39, 36, 02, 03, 04
Dial	I: # 6, 48 C: # 24, 27, 33, 34, 36, 02, 03, 04
Do	I: #48, 19 C: #33, 34, 36, 07, 08
Draw 3A	I: # 2 C: # 39, 36, 02, 03, 04
Drink 3A	I: # 6, 1 C: # 24, 27, 37, 43, 07, 08
Dig	I: # 6, C: # 24, 27, 02, 03, 04

E

Eat 3A	I: # 13, 19 C: # 38, 45, 33, 34, 01

F

Faint	I: # 41 C: #37, 43, 36, 06, 08
Fall 3A	I: # 48, 41 C: # 33, 34, 37, 43, 05, 08
Feed 3A	I: # 48, 3 C: # 33, 34, 39, 36, 05, 08
Fight 2B	I: # 1, 2, 3 C: # 37, 43, 39, 36, 07, 08
Flap	I: #48, 41 C: # 33, 34, 37, 43, 36, 05, 08

G

Get 3A	I: # 5, 19 C: # 24, 27, 33, 34, 07, 08
Go 3A	I: # 19 C: # 33, 34, 07, 08
Greet 1A	I: # 13, 5 C: # 38, 45, 24, 27, 36, 01

H

Hug	I: # 5, 48, 3 C: # 24, 27, 33, 34, 39, 36, 03, 04

I

Iron	I: # 6, 48 C: # 24, 27, 33, 34, 05, 08

J

Jump 3A	I: # 31, 41 C: # 38, 45, 37, 43, 07, 08

K

Kiss	I: # 3 C: # 39, 36, 02, 07, 08
Kick	I: # 48 C: # 33, 34, 02, 03, 04
Kneel	I: # 41 C: # 37, 43, 02, 03, 04, 06, 08

L

Laugh (at; about)	I: # 31 C: # 38, 45, (#37), 05, 08
Lick	I: # 48, 1 C: #33, 34, 37, 43, 36, 01, 05, 08

M

Make 3A	I: # 13, 48 C: # 38, 45, 33, 34

O

Open 2B	I: # 31, 13, 5 C: # 38, 45, (37), 24, 27, 07, 08

P

Plant 2B	I: # 6 C: # 24, 27, 02, 03, 04
Pick	I: # 48, 2 C: # 33, 34, 39, 36, 05, 08
Play 3A	I: # 13, 2 C: # 38, 45, 39, 36
Press	I: # 5, 48 C: # 24, 27, 33, 34, 36, 02, 03, 04
Pull	I: # 48, 41 C: # 33, 34, 37, 43, 36, 06, 08
Push	I: # 48 C:# 33, 34, 02, 03, 04, 06, 08

R

Ride 3A	I: #6, 2 C: # 24, 27, 39, 36, 05, 08
Run 3A	I: # 31, 1, 2 C: # 38, 45, 37, 43, 39, 36

S

Shake	I: # 31, 48, 3
	C: # 38, 45, 33, 34, 39, 36, (#37), 07, 08
Sit 3A	I: # 31
	C: #38, 45, (37)
Slap	I: # 48, 3
	C: # 33, 34, 39, 36, 05, 08
Sing 3A	I: # 13
	C: # 38, 45, 02, 03, 04
Smell 2A	I: # 1
	C: # 37, 43, 36, 01, 07, 08
Smile 3A	I: # 31, 41
	C: #38, 45, 37, 43, 05, 08
Squat	I: # 31, 41
	C: # 38, 45, 37, 43, 07, 08
Stand 2B	I: # 31,
	C: # 38, 45, (37)
Stomp	I: # 48, 41
	C: # 33, 34, 37, 43, 05, 08
Swim 3A	I: # 1
	C: # 37, 43, 02, 03, 04

T

Take 3A	I: #
	C: #
Talk 3A	I: # 31, 5
	C: #38, 45, (37), 24, 27, 05, 08
Touch 3A	I: #41
	C: # 37, 43, 02, 03, 04, 06, 08
Turn	I: #41
	C: #37, 43, 02, 03, 04, 06, 08
Twist	I: # 48, 1
	C: # 33, 34, 37, 43, 36, 01, 06, 08
Tickle	I: #13
	C: # 38, 45, 02, 03, 04, 07, 08

W

Walk 3A	I: # 5, 2
	C: # 24, 27, 39, 36
Wash 2B	I: # 19
	C: # 33, 34, 01, 05, 08
Watch 3A	I: #19
	C: # 33, 34, 07, 08
Wave	I: #5, 48
	C: # 24, 27, 33, 34, 36, 04
Write 3A	I: # 6
	C: # 24, 27, 07, 08

Y

Yawn	I: # 19, 3
	C: # 33, 34, 39, 36, 04, 07, 08

APPENDIX I2. BEAPs 2004 Distribution of Action Verbs in the Learning Tasks

Session 1

Action verbs: stand, sit, open, close, talk, run, jump, come, squat, crawl, smile, laugh, shake
Introduction: # 31
Consolidation: , #38, #45, (# 37)

Action verbs: greet, play, sing, make, blow, clap, cut, open, eat, tickle
Introduction: # 13
Consolidation: # 38, #45

Session 2

Action verbs: Bow, wave, talk, get, walk, press, open, greet, hug
Introduction: # 5
Consolidation: # 24, 27

Action verbs: Cut-cutter, comb-comb, dial-telephone, dig- shovel, drink-cup, iron-iron, cook-wok/ pan, write-pen/ pencil, buy-money, clean-cloth, ride-bicycle, plant-flowers
Introduction: # 6
Consolidation: # 24, 27

Session 3

Action verbs: Barbecue- BBQ fork Blow (away)- a balloon Cook- a fish Lick- some ice cream Pick- some flowers Pull- a door Push- a door Shake- some French Fries Slap- my face Stomp- my feet Wave- my hand Twist- a towel Break- a window Buy- a birthday cake Dial- a telephone number Do- homework Fall- into a big hole Feed- some animals Flap- your arms Make- a wish Press- a button Kick- a ball Bathe-a soap Hug-a baby Chase-a thief Iron-a
Introduction /Consolidation: # 48
Consolidation: # 33, 34

Action verbs: get, brush, wash, comb, eat, go, come, do, watch, bathe, yawn
Introduction: # 19
Consolidation: # 33, 34

Session 4

Action verbs: clap, stomp, turn, touch, pull, flap, jump, fall, crawl, faint, kneel, squat, smile
Introduction: # 41
Consolidation: #37, 43

Action verbs: smell, drink, swim, climb, lick, clap, twist, run, bark, fight
Introduction: # 1
Consolidation: # 37, 43

Session 5

Action verbs: walk, pick, bring, ride, play, barbecue, fight, run, break, draw, chase, bump, dig
Introduction: # 2
Consolidation: # 39, 36

Action verbs: shake, kiss, slap, ask, answer, dance, feed, hug, yawn, fight, chase, bump
Introduction: # 3
Consolidation: # 39, 36

General consolidation

Session 6

Action verbs: buy, wash, cut, cook, twist, clean, greet, clap, smell, lick, eat
Consolidation: # 01

Action verbs: answer, ask, brush, bow, clean, climb, dance, draw, dig, kiss, kick, kneel, plant, push, sing, swim, touch, turn, tickle, dial, press
Consolidation: # 02

Action verbs: answer, ask, brush, bow, clean, climb, dance, draw, dig, kick, kneel, plant, push, sing, swim, touch, turn, tickle, dial, press, hug
Consolidation: # 03

Action verbs: answer, ask, brush, bow, clean, climb, dance, draw, dig, kick, kneel, plant, push, sing, swim, touch, turn, tickle, dial, press, hug, wave, chase, yawn, bathe, squat
Consolidation: # 04

Session 7

Action verbs: talk, wash, smile, laugh, blow, clap, iron, ride, cook, buy, lick, pick, slap, stomp, break, fall, feed, flap
Consolidation: # 05

Action verbs: chase, pull, push, faint, kneel, turn, touch, twist, bark, bump, barbecue, bring, bathe, close
Consolidation: # 06

Action verbs: do, drink, fight, go, get, jump, kiss, open, smell, squat, watch, write, yawn, shake, tickle
Consolidation: # 07

Action verbs: talk, wash, smile, laugh, blow, clap, iron, ride, cook, buy, lick, pick, slap, stomp, break, fall, feed, flap chase, pull, push, faint, kneel, turn, touch, twist, bark, bump, barbecue, bring, bathe, close, do, drink, fight, go, get, jump, kiss, open, smell, squat, watch, write, yawn, shake, tickle
Consolidation: # 08

Session 8

Action verbs: ask, answer, bark, bring, brush, bow, bump, climb, close, crawl, dance, draw, dig, faint, go, kiss, kick
Consolidation: # 29 Twister

Action verbs: laugh, make, plant, play, sit, sing, stand, swim, walk, wash, watch, write, bring, answer, ask, bark, brush, bathe, bow, bump, clean, comb, come, crawl
Consolidation: # 44 Guesstures

Action verbs: cut, draw, dig, eat, faint, fall, feed, greet, kick, laugh, tickle, smell, wash, yawn
Consolidation: # 35 Pass the Massage

Action verbs: climb, crawl, iron, wave, bark, clap, cook, dial, push, smile
Consolidation: # 57 Slam the Dummies

APPENDIX J1. BEAP 2004 Action Group's Learning Tasks (A Typical Session)

Learning Task #31 Simon Says	
Input model:	**Action** **Action Verb Learning**
Learning objective(s):	• To learn some action verbs • To learn to give and follow simple instructions
Introduction/consolidation/both	• Introduction Action verbs (stand, sit, open, close, come, talk, run, jump, squat, crawl, smile, laugh, shake)
Prerequisite:	--
Grouping (no. of students per group):	Whole group activity
Procedure:	1. Clear a space in the classroom. The students will stand facing you in a large semi-circle with enough space to move comfortably. 2. Tell the students that they are going to have a fun game, but before that they have to learn some *action* verbs. 3. *Explain* to them that action verbs are a kind of word/ vocabulary that describes action. 4. Teach the *action verbs* by acting them out with the assistant teacher (AT). 5. Revise all the verbs taught and ask the students to remember the verbs. 6. Tell the students that they are going to play a game (First trial/ demonstration will be done by the AT) and divide them into two groups. 7. How to play: Call out a command such as "Simon says, sit down". 8. The students have to follow your command but should remain motionless if you do not precede the commands with "Simon says". 9. How to win: Students who do it correctly will receive one mark awarded to their groups as a whole. <u>Variation</u> Invite students to be "Simon" when they have been familiarized with the game.
Duration:	30 minutes
Equipment/ materials:	• Action verb flash cards • Seats • Books (prepared by students)
Appropriate site:	Classroom

Learning Task #13 My Birthday Party	
Input model:	**Action** **Action Verb Learning**
Learning objective(s):	• To learn some action verbs related to scenes of a birthday party
Introduction/consolidation/both	• Introduction Action verbs (greet, play, sing, make, blow, clap, cut, open, eat, tickle) • Names of objects found in birthday party
Prerequisite:	--
Grouping (no. of students per group):	2 (5-5)
Procedure:	1. First, brainstorm with the students what they will normally do in a birthday party. 2. Ask them if they will do the following in a birthday party and stick the sentences one by one on the board: • My friends ***greet*** me. • We ***play*** games. • I ***tickle*** my friends. • We ***sing*** "Happy Birthday" • I ***make*** a wish. • I ***blow out*** the candles • We ***clap*** hands. • I ***cut*** the cake. • We ***eat*** the cake. • I ***open*** the presents. 3. Teach the students the action verbs in the sentences and ask them to do the action together. 4. After teaching them all the sentences, tell the students that they are going to have a birthday party drama show. 5. How to play: The students are to split into two groups, the teaching assistants will help them revise the action sequence. 6. The teacher is to read the sentences one by one, simultaneously, the two groups have to perform the actions accordingly. 7. How to win: The group with better performance in terms of teamwork and accuracy wins.
Duration:	30 minutes
Equipment/ materials:	• Action verb flash cards • Sentence strips
Appropriate site:	Classroom

Learning Task #38 Noughts and Crosses	
Input model:	**Action** **Action Verb Learning**
Learning objective:	• To reinforce the action verbs learnt in other sessions
Introduction/consolidation/both	• Consolidation # 31, 13 Action verbs
Prerequisite:	--
Grouping (no. of students per group):	2(5-5)
Procedure:	1. Revise the action verbs with the students by showing them the action verb cards and by asking them to verbalize and/ or to act the verbs out. 2. Divide the members into two teams. 3. Stick a large noughts and crosses grid (5x5 squares) on the board. All the squares are numbered and represent different actions. 4. Demonstrate how to play: the assistant teacher chooses a square, and the teacher reads out the command associated with the square, e.g. "*Squat*". The AT has to perform the action. He/she can put a cross on that square, if he/she does it correctly. 5. Start the game: two teams take turns to choose a square and perform the action. One team uses noughts while another team uses crosses. 6. How to win: get a row of three noughts or crosses in any direction. 7. The team getting more rows of three noughts or crosses in any direction wins.
Duration:	30 minutes
Equipment/ materials:	• Action verb flash cards • A large grid with 25 squares on them
Appropriate site:	Classroom

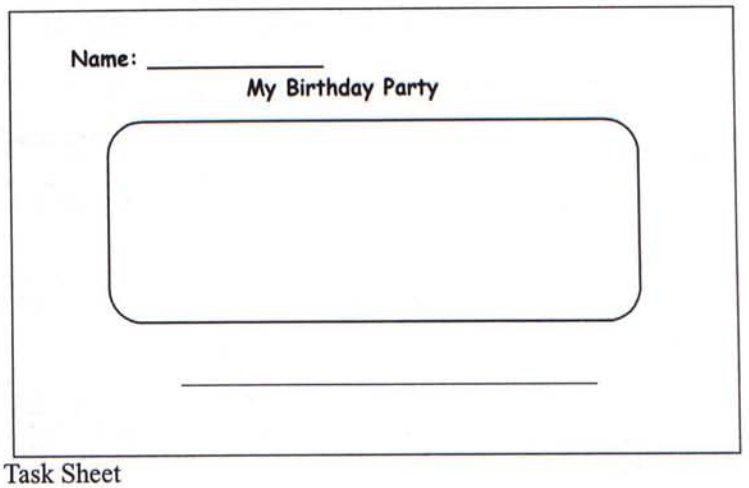
APPENDIX J2. BEAP 2004 Picture Group's Learning Tasks (A Typical Session)

Learning Task #16 Body Movements	
Input model:	**Picture** **Action Verb Learning**
Learning objective(s):	• To learn some action verbs related to different parts of the body
Introduction/consolidation/both	• Introduction Action verbs (stand, sit, open, close, come, talk, run, jump, squat, crawl, smile, laugh, shake)
Prerequisite:	--
Grouping (no. of students per group):	2 (5-5)
Procedure:	1. Tell the students that they are going to have a fun game, but before that they have to learn some *action* verbs. 2. *Explain* to them that action verbs are a kind of word/ vocabulary that describes action. 3. Introduce the following *action verbs* related to different parts of the body by using action verb picture cards. Ask the students to remember the pictures and the actions. 4. Read out the verbs together for a few times. 5. How to play: Divide the students into two groups. Each group has a teaching assistant as the facilitator. 6. Put two big body shape cards (front & back) on the board. 7. Give each student a verb card(s) randomly (the teachers have to make sure they know what the verbs mean). 8. Then, each team sends out one representative each round. 9. First, they have to read out the action verb, then, they have to stick the verb card on the body part that is responsible for that action. Award one mark for each correct matching. 10. How to win: The team that has more marks wins. 11. If time is allowed, play another round.
Duration:	30 minutes
Equipment/ materials:	• Action verb picture cards • Action verb cards (small) • 2 large body shape cards (front and back)
Appropriate site:	Classroom

(Ref: Exp.#31)

Learning Task #14 My Birthday Party	
Input model:	**Picture** **Action Verb Learning**
Learning objective(s):	• To learn some action verbs related to familiar scenes of a birthday party
Introduction/consolidation/both	• Introduction Action verbs (greet, play, sing, make, blow, clap, cut, open, eat, tickle) • Names of objects found in a birthday party
Prerequisite:	--
Grouping (no. of students per group):	2 (5-5)
Procedure:	1. First, brainstorm with the students what they will normally do in a birthday party. 2. Show a picture and ask them if they will do what is shown in the picture in their birthday parties. Stick the corresponding sentence strip on the board. Some suggestions: • My friends ***greet*** me. • We ***play*** games. • I ***tickle*** my friends. • We ***sing*** "Happy Birthday" • I ***make*** a wish. • I ***blow*** out the candles • We ***clap*** hands. • I ***cut*** the cake. • We ***eat*** the cake. • I ***open*** the presents. 3. Teach the students each verb of the sentence also with the help of the action verb picture card. 4. How to play: Divide them into two groups. Give each student a picture. Ask them to write down the corresponding sentence on a provided sheet. 5. The TA has to check the sentence and give them marks if they do it correctly. Collect their sheets afterwards. 6. Then, ask the students to give the picture to the person next to him/ her. 7. How to win: The team that has more marks in total wins. **Variation** Ask them to draw a different picture for a scene of a birthday party, with himself/ herself as one of the characters. After that, the TA will ask them to describe the pictures, using the action verbs/ sentences they just learnt (e.g. I *make* a wish).
Duration:	30 minutes
Equipment/ materials:	• Pictures (of birthday scenes) • Action verb picture cards • Task Sheets
Appropriate site:	Classroom

(Ref.: Exp. #13)



Task Sheet

Learning Task #20 Noughts and Crosses	
Input model:	**Picture** **Action Verb Learning**
Learning objective:	• To reinforce the action verbs learnt in other sessions
Introduction/consolidation/both	• Consolidation #16, 14
Prerequisite:	--
Grouping (no. of students per group):	2(5-5)
Procedure:	1. Revise the action verbs with the students by showing them action verb picture cards and asking them to verbalize the action verbs. 2. Divide the members into two teams. 3. Stick a large noughts and crosses grid (5x5 squares) on the board. All the squares are numbered. 4. Demonstrate how to play: the assistant teacher chooses a square, and the teacher shows the numbered picture. The AT can put a cross on that square, if he/ she can say the action verb associated with the picture correctly. 5. Start the game: two teams take turns to choose squares and verbalize action verbs. One team uses noughts while another team uses crosses. 6. How to win: get a row of three noughts or crosses in any direction. 7. The team getting more rows of three noughts or crosses in any direction wins.
Duration:	30 minutes
Equipment/ materials:	• A large grid with 25 squares on them • 25 pictures (without action verbs)
Appropriate site:	Classroom

(Ref: Action Group #38)

APPENDIX J3. BEAP 2004 Combined Group's Learning Tasks (A Typical Session)

Learning Task # 1 Look and Move	
Input model:	**Action + Picture** **Action Verb Learning**
Learning objective(s):	• To learn some action verbs related to different parts of the body • To learn to give and follow simple instructions
Introduction/consolidation/both	• Introduction ction verbs (stand, sit, go, open, close, come, talk, run, jump, squat, crawl, smile, laugh, shake)
Prerequisite:	--
Grouping (no. of students per group):	Whole group activity
Procedure:	1. Stick two big body shape cards (front & back) on the board and clear a space in the classroom. The students stand facing you in a large semi-circle with enough space to move around comfortably. 2. Tell the students that they are going to have a fun game, but before that they have to learn some *action* verbs. *3.* *Explain* to them that action verbs are a kind of word/ vocabulary that describes an action. 4. Show them action verb picture cards. Teach the *action verbs* by asking them to imitate the actions shown in the pictures (The teacher and the assistant teacher (AT) will do the actions with them). 5. After teaching one action verb, ask the students if they know which part(s) of the human body will be involved in doing the action. Prompt the answer from the students and choose a student to stick the small action verb cards onto the related parts of the body shape cards on the board. 6. After teaching, revise all the verbs taught and ask the students to remember the verbs as many as possible. 7. Divide the students into two groups and tell them that they are going to play a game (First trial/ demonstration will be done by the AT). 8. How to play: Either call out a command such as "Simon says, sit down", or say "Simon says" followed by showing a picture (with the action verb omitted). 9. The students have to follow your command or imitate the action shown in the picture, but should remain motionless if you do not precede the commands with "Simon says". 10. How to win: Students who do it correctly will receive one mark awarded to their groups as a whole. Variation(s) Invite students to be "Simon" when they are familiar with the game.
Duration:	30 minutes
Equipment/ materials:	• Seats • Books (prepared by students) • Action verb picture cards (1 set with the verbs; 1 set without the verbs) • Action verb flash cards • Action verb cards (small) • 2 large body shape cards (front and back)
Appropriate site:	Classroom

Learning Task # 2 My Birthday Party	
Input model:	**Action + Picture** **Action Verb Learning**
Learning objective(s):	• To learn some action verbs related to some scenes of a birthday party
Introduction/consolidation/both	• Introduction Action verbs (greet, play, sing, make, blow, clap, cut, open, eat, tickle) • Names of objects found in a birthday party
Prerequisite:	--
Grouping (no. of students per group):	2 (5-5)
Procedure:	1. First, brainstorm with the students what they will normally do in a birthday party. 2. Show a picture of the following birthday scenes and ask them if they will do what is shown in the picture in their birthday parties. Stick the corresponding sentence strip on the board: • My friends ***greet*** me. • We ***play*** games. • I ***tickle*** my friends. • We ***sing*** "Happy Birthday" • I ***make*** a wish. • I ***blow out*** the candles • We ***clap*** hands. • I ***cut*** the cake. • We ***eat*** the cake. • I ***open*** the presents. 3. Teach the students each verb of the sentence and ask them to do the action as shown in the picture together. 4. After teaching them all the sentences, tell the students that they are going to have a birthday party drama show. 5. How to play: The students are to split into two groups, and the teaching assistants will help them revise all the actions. 6. The teacher is to show the pictures and read the corresponding sentences one by one, and simultaneously, the two groups have to perform the actions accordingly. 7. How to win: The group with better performance in terms of teamwork and accuracy will win.
Duration:	30 minutes
Equipment/ materials:	• Action verb flash cards • Pictures of the following birthday scenes • Sentence strips
Appropriate site:	Classroom

Learning Task # 3 Noughts and Crosses	
Input model:	**Action + Picture** **Action Verb Learning**
Learning objective:	• To reinforce the action verbs learnt in other sessions • To learn to respond to instructions
Introduction/consolidation/both	Consolidation
Prerequisite:	--
Grouping (no. of students per group):	2(5-5)
Procedure:	1. Revise the action verbs with the students by showing them action verb picture cards and by asking them to verbalize and/ or act the verbs out. 2. Divide the members into two teams. 3. Stick a large noughts and crosses grid (5x5 squares) on the board. All the squares are numbered and represent different actions. 4. Demonstrate how to play: the assistant teacher chooses a square, and the teacher either reads out the command or shows the picture associated with the square, e.g. "*Squat*". The AT has to perform the action as well as verbalizing the action verb. The AT can put a cross on that square, if the action has been correctly performed. 5. Start the game: two teams take turns to choose a square. One team uses noughts while another team uses crosses. 6. How to win: get a row of three noughts or crosses in any direction. 7. The team getting more rows of three noughts or crosses in any direction wins.
Duration:	30 minutes
Equipment/ materials:	• Action verb flash cards • Action verb picture cards • 25 pictures (without action verbs) • A large grid with 25 squares on them
Appropriate site:	Classroom

APPENDIX K1. Pre-test of the Second Study

Name: _____ Date: _____

Time limit: 20 minutes

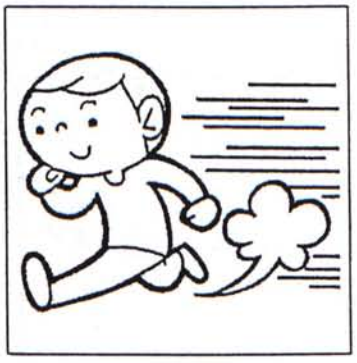
Part 1: Matching. 第一部份： 配對。

Match the action verbs with the pictures.

請將動詞和其相關圖畫作配對，把答案填在橫線上。

run	barbecue	eat	climb	hug	lick

e.g.



run

1.

_____

2.

_____

3.

_____

4.

_____

5.

_____

bathe slap kiss iron kick

faint smile sing twist

6. 

7. 

8. 

9. 

10. 

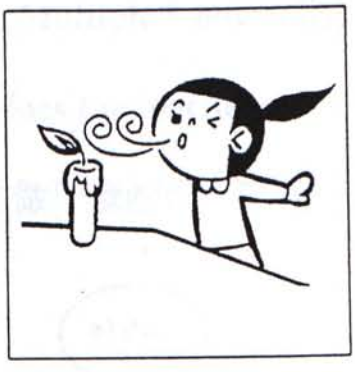
11. 

12. 

13. 

14. 

push	cook	bump	blow

15. 

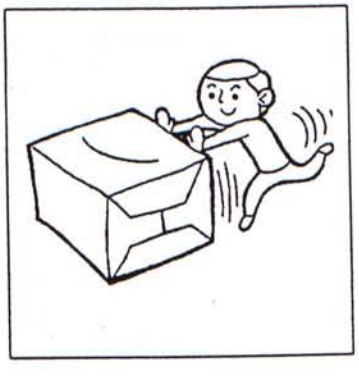
_____

16. 

_____

17. 

_____

18. 

_____

Name: _____ Date: _____
Time limit: 20 minutes

Part 2: Multiple Choice. 第二部份：選擇題。

What does the teacher do? Circle the <u>best</u> answer.

老師在做什麼動作? 請圈出<u>最適當</u>的動詞答案。

e.g. a) run b) jump c) fall

1. a) draw b) write c) do

2. a) come b) cut c) wash

3. a) blow b) squat c) sit

4. a) clap b) shake c) jump

5. a) run b) swim c) wave

6. a) watch b) sit c) squat

7. a) bow b) hug c) talk

8. a) drink b) eat c) smell

9. a) sit b) squat c) crawl

_____

10. a) comb b) wash c) smile

_____

11. a) swim b) flap c) dig

_____

12. a) bow b) stand c) jump

_____

13. a) pull b) push c) draw

_____

14. a) twist b) shake c) go

_____

15. a) climb b) smile c) yawn

_____

16. a) write b) walk c) pick

_____

17. a) touch b) wave c) smell

_____

18. a) chase b) bow c) kneel

_____

~ The end of the paper ~

APPENDIX K2. Post-test of the Second Study

Name: _____ Date: _____

Class: _____ Time limit: 30 minutes

Part 1: Matching. 第一部份： 配對。

Match the action verbs with the pictures.

請將動詞和其相關圖畫作配對，把答案填在橫線上。

run	bathe	slap	kiss	iron	kick

e.g.

run

1.

_____

2.

_____

3.

_____

4.

_____

5.

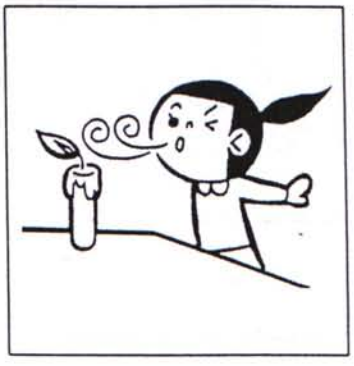
_____

barbecue	eat	climb	hug	lick
push	cook	bump	blow	

6.

7.

8.



9.

10.

11.

12.

13.

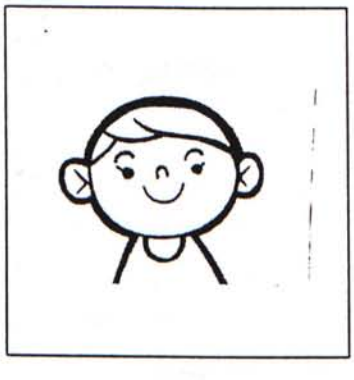
14.

faint smile sing twist

15. 

16. 

17. 

18. 

Name: _____ Date: _____
Time limit: 20 minutes

Part 2: Multiple Choice. 第二部份：選擇題。

What does the teacher do? Circle the <u>best</u> answer.

老師在做什麼動作? 請圈出<u>最適當</u>的動詞答案。

e.g.	a) run	b) jump	c) fall
1.	a) come	b) cut	c) wash
2.	a) blow	b) squat	c) sit
3.	a) draw	b) write	c) do
4.	a) swim	b) run	c) wave
5.	a) clap	b) shake	c) jump
6.	a) watch	b) squat	c) sit
7.	a) talk	b) hug	c) bow
8.	a) sit	b) crawl	c) squat
9.	a) drink	b) smell	c) touch

10. a) flap b) swim c) dig

11. a) comb b) wash c) smile

12. a) jump b) stand c) bow

13. a) push b) pull c) draw

14. a) twist b) go c) shake

15. a) climb b) yawn c) smile

16. a) walk b) write c) pick

17. a) touch b) smell c) wave

18. a) chase b) bow c) kneel

~ The end of the paper ~

APPENDIX L1. Subjects' Pre-program Questionnaire of the Second Study

Name: _____ Date: _____

Group: _____

Evaluating student's learning English as a foreign language. (Put a √ in each question.)

a) Speaking

1. Are you willing to speak English in front of other people?

   你會否願意與別人說英文?

☐ very willing十分願意 ☐ willing願意 ☐ fairly willing一般願意

☐ not very willing不太願意 ☐ not willing不願意

2. What is the volume of your voice when you speak English?

   你講英文的聲量如何？

☐ very loud十分響亮 ☐ loud 響亮 ☐ fairly loud一般響亮

☐ not very loud不太響亮 ☐ not loud不響亮

b) Listening聆聽

1. How well do you listen to the English language?

   你對英文的聆聽能力如何？

☐ very well十分好 ☐ well好 ☐ fairly well一般

☐ not very well不太好 ☐ not well不好

c) Learning attitudes 學習態度

1. What do you think of English?

   你對英文的印象如何?

(You may tick <u>more than one</u> box.)可選多於一項

☐ interesting	有趣	☐ boring	沉悶
☐ easy	容易	☐ difficult	困難
☐ useful	有用	☐ useless	無用

2. Do you like to learn English?

   你喜歡學習英文嗎?

☐ very much十分喜歡 ☐ quite like頗喜歡 ☐ fairly like一般喜歡

☐ not very much不太喜歡 ☐totally not完全不喜歡

3. What is your confidence level of learning English?

   你對於學習英文的信心如何?

☐ very high很高 ☐ high高 ☐ fairly high一般

☐ not very high不太高 ☐ not high不高

4. Do you find yourself actively participate in class?

   你覺得自己在課堂中有積極參與嗎?

☐ always經常 ☐ quite often頗經常 ☐ sometimes有時

☐ seldom很少 ☐ never從不

d) Learning styles and preferences學習喜好

1. What is your preferred way of learning English language?
   你喜歡怎樣學習英文呢?

(You may tick <u>more than one</u> box.)可選多於一項

☐ has many activities/ games
有很多活動/遊戲

☐ has interesting teaching content
有趣的教學內容

☐ can look at pictures/ real objects
可以看圖畫/ 實物

☐ can listen to teacher/ other students speaking English 可以聽老師講英語

☐ can speak English 可以自己講英語

☐ can learn in small groups
可以與同學在小組中學習

☐ has good teacher and assistant teachers
有很好的教師及助教

☐ has awards (e.g. candies and stickers)
有獎品

☐ others 其他 (e.g. 如_____)

2. What caused some difficulty for you to learn English?
   有什麼阻礙你學習英文呢?

(You may tick <u>more than one</u> box.)可選多於一項

☐ in lack of activities/ games
欠缺活動/遊戲

☐ boring teaching content
沉悶的教學內容

☐ in lack of teaching aids 欠缺教具

☐ no chance to listen to teacher/ other students speaking English
沒有機會聽老師講英語

☐ no chance to speak English
沒有機會自己講英語

☐ no chance to learn in small groups
不能與同學在小組中學習

☐ teacher and assistant teachers 教師及助教

☐ in lack of awards (e.g. candies and stickers)
欠缺獎品

☐ others 其他 (e.g. 如_____)

3. Which is/ are the <u>most</u> memorable activity(ies) in learning English language?

在學習英文中, 你印象最深刻的是哪一(些)活動?

_____

4. Why did you join this English language program?

你爲何參加此課程嗎?

(You may tick <u>more than one</u> box.)可選多於一項

☐ encouraged by my parents 父母鼓勵參與

☐ encouraged by my teachers 教師鼓勵參與

☐ want to learn more English 自己想多學習英文

☐ others其他 (原因:_____)

~ The end of the questionnaire ~

APPENDIX L2. Subjects' Post-program Questionnaire of the Second Study

Name: _____ Date: _____

Group: _____

Evaluating student's learning English as a foreign language. (Put a √ in each question.)

a) Speaking

1. After joining the program, are you willing to speak English in front of other people?

   參加此課程後, 你會否願意與別人說英文?

☐ very willing十分願意 ☐ willing願意 ☐ fairly willing一般願意

☐ not very willing不太願意 ☐ not willing不願意

2. After joining the program, what is the volume of your voice when you speak English?

   參加此課程後, 你講英文的聲量如何？

☐ very loud十分響亮 ☐ loud 響亮 ☐ fairly loud一般響亮

☐ not very loud不太響亮 ☐ not loud不響亮

b) Listening聆聽

1. After joining the program, how well do you listen to the English language?

   參加此課程後, 你對英文的聆聽能力如何？

☐ very well十分好 ☐ well好 ☐ fairly well一般

☐ not very well不太好 ☐ not well不好

c) Learning attitudes 學習態度

1. After joining the program, what do you think of the English language?

   參加此課程後, 你對英文的印象如何?

(You may tick <u>more than one</u> box.)可選多於一項

☐ interesting	有趣	☐ boring	沉悶
☐ easy	容易	☐ difficult	困難
☐ useful	有用	☐ useless	無用

2. After joining the program, do you like to learn English?

   參加此課程後, 你喜歡學習英文嗎?

☐ very much十分喜歡 ☐ quite like頗喜歡 ☐ fairly like一般喜歡

☐ not very much不太喜歡 ☐ totally not完全不喜歡

3. After joining the program, what is your confidence level of learning English?

   參加此課程後, 你對於學習英文的信心如何?

☐ very high很高 ☐ high高 ☐ fairly high一般

☐ not very high不太高 ☐ not high不高

4. Do you find yourself actively participate in the lessons of the program?

   你覺得自己在此課程的課堂中有積極參與嗎?

☐ always經常 ☐ quite often頗經常 ☐ sometimes有時

☐ seldom很少 ☐ never從不

d) Learning styles and preferences學習喜好

1. After joining the program, what is your preferred way of learning English language?
   參加此課程後, 你喜歡怎樣學習英文呢?

(You may tick <u>more than one</u> box.)可選多於一項

☐ has many activities/ games
有很多活動/遊戲

☐ has interesting teaching content
有趣的教學內容

☐ can look at pictures/ real objects
可以看圖畫/ 實物

☐ can listen to teacher/ other students speaking English 可以聽老師講英語

☐ can speak English 可以自己講英語

☐ can learn in small groups
可以與同學在小組中學習

☐ has good teacher and assistant teachers
有很好的教師及助教

☐ has awards (e.g. candies and stickers)
有獎品

☐ others 其他 (e.g. 如_____)

2. What caused some difficulty for you to learn English in the program?
   在此課程的課堂中, 有什麼阻礙你學習英文呢?

(You may tick <u>more than one</u> box.)可選多於一項

☐ in lack of activities/ games
欠缺活動/遊戲

☐ boring teaching content
沉悶的教學內容

☐ in lack of teaching aids 欠缺教具

☐ no chance to listen to teacher/ other students speaking English
沒有機會聽老師講英語

☐ no chance to speak English
沒有機會自己講英語

☐ no chance to learn in small groups
不能與同學在小組中學習

☐ teacher and assistant teachers教師及助教

☐ in lack of awards (e.g. candies and stickers) 欠缺獎品

☐ others 其他 (e.g. 如_____)

3. Which is/ are the <u>most</u> memorable activity(ies) in the program?

在課程中, 你印象最深刻的是哪一(些)活動?

_____

4. Would you join this English language program in the future if you have given the chance?

你以後如果有機會還會再參加此課程嗎?

(You may tick <u>more than one</u> box.)可選多於一項

☐ Yes會

(Why?原因:_____)

☐ No不會

(Why?原因:_____)

~ The end of the questionnaire ~

APPENDIX M1. Teachers' Post-program Questionnaire of the Second Study

Name:
Group no.:
Date:

The following questions aim at the teachers of the Brain-based English Activity Programs 2004. Please answer the questions genuinely and truthfully. Note that these questions are not for the sake of evaluation of the teachers, but for collecting teachers' opinions only.

1. What do you think of students' responses/ reaction to the learning activities in general in the first two lessons of the brain-based program?

2. What do you think of students' responses/ reaction to the learning activities in general in the end of the program?

3. Throughout the program, did you find any change in students' ... (as below):
- Participation in class
- Learning attitudes
- Conduct
- Interaction with other students

4. Have you benefited from this brain-based framework of teaching? If yes, please exemplify.

5. Did you enjoy teaching in the program? Why?

6. Do you foresee any difficulties for the learning tasks of the program to be incorporated into the regular curriculum?

~ The end ~

APPENDIX M2. Unedited Comments Gathered from the Teachers' Questionnaire

Action Group

1.

- The program seemed quite fresh to them. They seemed quite interested in it but not very enthusiastic. They appeared quite happy moving their bodies.
- feel interested
- didn't understand the rules of the games very well
- positive

2.

- They're much more interested in it. They're very eager to get marks for their groups. But they seemed a bit bored in games which had similar patterns. However, generally, they enjoyed playing those games. Some even kept asking what games they're going to play. Some of them also seemed a bit bored by the repeated action practiced in the revision section.
- feel happy to learn and play
- willing to answer questions
- co-operative with team members

3.

Participation in class

- Most of the students had improved participation. One student was very active, but he's complained by the opposing team to be too dominant in his group. Then he became very quiet that lesson. And there's one student who's quiet and he kept quiet and passive throughout the program.
- co-operative with members
- more involved

Learning attitudes

- Some were bored by the repeated words. So they appeared less interested in practicing.
- willing to learn
- interested in vocabulary

Conduct

- Not really big change
- good behaved

Interaction with other students

- More interaction within the same group members.
- communication increased

4.

- I know that games can increase students' motivation. And teaching words using action can be interesting and useful in the class. I taught secondary school students in an English program before and after this program, I find that teaching students of different ages have to use different approaches.
- knew a new kind of teaching method
- knew more English teaching activities

5.

- Yes. The students in my group are very good students. And they're really benefited from the program. So the satisfaction is quite good.
- Yes. the students enjoyed it too.
- the activities were quite funny
- they have progression

6.

- The part of games is more suitable to classes with small size. And doing the action takes quite a lot of space. And the program may be very time-consuming in the actual tight schedule.
- there are not enough time for games in regular class
- the class size limited the activities being held
- there are many other criteria other than vocabulary in regular class.

Picture Group

1.

- They seemed very excited to the games because many games were new to them. But then, they were still not very familiar with the action verbs that we taught. Very often, they couldn't get the answer in the games. They had to use more time to think and thus there was some "dead air". At the same time, the team spirit was not yet well developed and their cooperation, within groups, was not very good. As a result, there were some "chaotic" movements during group work.
- Passive participate in learning activities
- Not pay attention to the class
- don't willing to share with classmates

2.

- It was getting much better than the beginning. As the verbs were important elements of the games, the games were much more enjoyable to the students when they really knew/remembered the verbs. The satisfaction was greater (as they could get most of the correct answers). The games were conducted smoothly. They were familiar with the format of the games. But towards the end, some games were not as interesting as those in the beginning. Some students might not pay their full attention even during the games.
- More active participate in the activities
- Can pay more attention in the class
- Enjoy the activities

3.

<u>Participation in class</u>

- The general situation was that in the middle, their participation was best (although it fell a little bit near the end, it was still better than at the beginning). It depended very much on the students' states that day. Sometimes, they had something to do in the morning and just came to class in a hurry. They might have some other activities and thus they were tired that day. Or they hadn't have lunch yet when they came to class. However, generally speaking, if the content of the materials/games was interesting, we could gain more and more participation as the games proceeded.
- More active

Learning attitudes

- Their learning attitudes were rather positive. They were eager to learn new things (the action verbs). There wasn't any noticeable change during the program.
- More positive

Conduct

- It was getting better in the middle of the program (till the end of program). Perhaps we, the teacher and the teaching assistant, began to understand more about the children and know how we should deal with them. They might still have a little quarrel in the class. However, we could control the situation (in the beginning, it was much harder to stop them from arguing). One or two students, at the beginning, didn't participate much in the class. They just sat there in an idle way. But later, they became more involved in the revision/activities.
- No significant change

Interaction with other students

- One "essential" part of their interaction (that I observed) was their arguments. There might be quarrels between the two groups. Even within the same group, they would compete with each other in order to be the one taking charge/ making decision. However, as time passed, they cooperated better by talking with their group members. For example, they would encourage the more brilliant students in their teams to put up their hands to answer.
- A little bit improvement.

4.

- Yes, I've benefited from this brain-based program. It makes me aware more about the potential of our brains. The traditional teaching method is not the only way to make us learn. Different techniques can be employed to stimulate our brains in order for us to learn better. Furthermore, in the process, I understand that students' emotion is a very important factor to their learning.
- Yes. Because I learnt a number of new teaching methods through the program.

5.

- Yes, I did enjoy the teaching experience. We've been learning the teaching theories in lectures for a long time. It is a very different thing when we really have to face the students. In the past, I only had the experience of teaching secondary school students. So this time dealing with the very young primary three students was a brand new challenge to me. At first I thought that the children were too "wild" and naughty. However, gradually, I began to like them. Now I'm sure I'll miss the students in the future. But I'd also say that the teaching duty was really exhausting. The first thing was we were not as energetic as the children. Another thing was that every time the schedule was very tight. We had to do many different things at the same time, e.g. arranging the materials for the games, helping students to pay attention, keeping time limit, etc. So I'm really happy to have a break now.
- Yes. Because of the improvement and enjoyment of the students during the program.

6.

- There must be some difficulties. For one thing, the class size is too big. In the normal classroom, there are about thirty to forty students. But in this program, many games require small group work. If this is the case, then the class will be broken into 6-8 groups. The teacher may not be able to look after them all. Now we have 2 teachers for 10 students and we're already busy enough. I can't imagine the situation if one or two teachers have to handle 30-40 students playing games together. Another problem is that the workload of the teachers would be too heavy. The normal teachers in school have to teach many different classes. If they need to prepare the games too (e.g. read the teaching plan, check the teaching materials, stick them on board/arrange them into order, etc.), they would be very very busy.
- My suggestion would be this: the schools can employ some teaching assistants responsible for bringing these new elements (e.g. games, brain-based framework) to normal classes. So they are to prepare the materials, check things, etc. Perhaps for every class, they will have at least one time in a week to have this kind of special English lessons. If the class size is too big, they may even split the class. E.g. the teaching assistants will play with half of the class in another room, while the original teacher will look after the other half of the class (e.g. they can have reading class then). Next time, the two groups change the roles.
- I think most of the learning activities of brain-base program can be incorporated into the regular curricular, but some of the activities which involved more movement maybe difficult to conduct for normal class size (around 40 per class) and the absent of T.A.

Combined Group

1.

- I think on the first lesson, many students have to adapt to this activity-based teaching. There is one student who is exceptionally active (曾日城) and helped to demonstrate almost all the action verbs. As for most students, they adapted to the activities quite well and were happy to act and speak out the verbs.
- There were only 1-2 students who remain rather passive and did not do any action or speak up during the lesson. But she became much more active in the next few lessons.
- Very interested
- Curious about the course
- Willing to learn

2.

- I believe the children enjoyed the games and competition very much. When the teacher is teaching the action verbs, their reaction was rather tired and a little bored, but they all tried to follow the teacher's teaching.
- It was the games and competition part in general, that the students become active and involved. I believe they may find particular games very exciting, such as #26 Pass the Hat! Pass the Bag and #3 Noughts and Crosses
- Very willing to learn
- More confident in speaking English
- Answer more questions in English

3.

Participation in class

- Yes, I find involvement of students increased greatly as the lessons proceed. Particular participation of students, eg Ju Ka Yan and Mak Chui Ying improved.
- More concentrated
- More response
- Understand the regulations of games more clearly

Learning attitudes

- On the whole, I discovered some very bright, diligent and "obedient" students, such as Chan Shuk Yi, Lee Chun Lok and Lee Chi Hang, they have very positive learning attitude.
- Ju Ka Yan and Mak Chui Ying seem to be very passive and aloof in the first few lessons, but they become much more active in the following lessons.
- As for 曾日城, I believe he really enjoyed the lessons

Conduct

- Tsang Yick Shing, as commented by teachers to be very naughty in regular class, become a very good demonstrator in this class. Most of the students do not have conduct problems, but particularly Ju Ka Yan and Mak Chui Ying are not very cooperative in class. They tend to talk to each other most of the time during lessons.
- Cheung Han Lung at first seems to "harass" Chau Chi Kit in the first few lessons. After I separated them, the situation improved.
- Discipline improved as the course went on

Interaction with other students

- Most of the students engaged well in the activity, but still it is particular students who are not cooperative initially, eg, Ju Ka Yin and Mak Chui Ying. But the situation improved.
- Interestingly, 曾日城 tends to get the wrong answers most of the time, thought his group mates blame him occasionally, he still gets along well with his team.
- More co-operate with their team members
- More discussions

4.

- I have benefited greatly from this activity. The greatest benefit is that I am able to learn from experienced teachers on class management and teaching skills.

  Teaching skills:

  - I have learnt not to talk too fast and always try to slow down. It is no use teaching them everything if they pick up nothing, so I learnt to slow down.
  - Learn to give simple commands and directions in English.

  Class Management:

  - How to control the class when the students are too noisy.
  - How to settle disputes that occur during games, eg by analyzing the situation to students and also be fair.
  - How to settle disputes in class, eg when the students got hurt when playing during class.
  - How to divide groups and separate students who are always talking
- New method of teaching
- Apply more activities in teaching

5.

- Yes, although it is tiring at the end of the day, but I feel that it is worthwhile. I can learn a lot from the teachers and students.
- I like interacting and teaching the students and I think it is fun to teach students using so much activities.
- Rhe activities are very interesting
- The pupils enjoy the learning process

6.

- The difficulty is class size. Regular classes are large and the classroom is confined so it is difficult to play so many games. Moreover, the large class size will be hard to manage if the teacher plays games with the children.
- It can now only be apply in the extra-curricular period
- Number of students
- Resources

APPENDIX N1. Questions of the First and the Second Part of Subjects' Interview

First part

1. Before you attended the program, did you like to learn English?
2. After attending the program, did you like to learn English?
3. Before you attended the program, what did you think about learning English?
4. After attending the program, what did you think about learning English?
5. What were the good things about the program?
6. What were the bad things about the program?
7. Do you like the program?

Second part

1. Did you *think* about doing the action shown in the action verb picture cards by yourself or by others?
2. Did you *perform* the action shown in the action verb picture cards?

APPENDIX N2. Transcriptions of Subjects' Interview

Action Group
Date: 18th March 2004
Length: 7 minutes
R: Researcher
S3: Subject 3

R: I mainly want to discuss with you about the course, the improvement that I can do on this course. Because I am the one who designs the course. Were you happy attending the course?

S3: Happy.

R: Okay, we start now. Let me look at your questionnaire first. Here, you said that whether you were willing to speak in English with English, you said that your willingness to speak English was so-so. Did this happen before you attended the course?

S3: Um… Before attending the course.

R: Was this the situation?

S3: Yes.

R: How about after attending *the course?

S3: *(I was) willing to speak English

R: You were willing to speak English, so your answer would be different from what you answered in your questionnaire. Okay, I understand. So, I would like to ask, before you attend this course, did you like to lean English?

S3: I liked to (learn English).

R: You liked to learn English. Why?

S3: Because by learning English, I can communicate with foreigners.

R: Communicating with foreign teachers, okay. After attending the course, did you like to learn English?

S3: I liked to.

R: You liked to. Was there any change in the degree of your fondness in learning English?

S3: No.

R: You liked it as before? Um. Before you attended this course, what did you think about learning English?

S3: Some vocabularies are difficult.

R: A little bit difficult. So, after attending the course?

S3: I think, some vocabularies that I have learned before which I think were difficult, now, I think they have become easier.

R: For example?

S3: Um…

R: For example, some words that you have seen them before, but they were unknown to you, yet, you have learned them in this course. Okay. What were the good things about this course?

S3: It gave us a chance to experience new kind of learning method. We didn't have to memorize words as before. It uses some actions to explain the meanings of words.

R: Actions. Any other? Please continue.

S3: Um…In the course, we could play many games. In normal lessons, we don't have so many games.

R: What did you think about the games? Could they help you to learn, or, you learned nothing because you were concentrating in playing games?

S3: No. Those games were mostly related to English.

R: There were games that were unrelated to English?

S3: A little bit.

R: There were. For example?

S3: Um…For example, there was a game when teacher read the action verb that we were holding, we had to walk one step further.

R: I understand. Were there anything bad about this course?

S3: No.

R: Could you try to think about it?

S3: No.

R: Just speak it frankly, is there any bad thing about the course?

S3: No.

R: Really? Was the teacher good?

S3: Good.

R: Classmates?

S3: Good.

R: Also good. All things were good. Were the activities good? Was there anything bad?

S3: No.

R: Did you participate actively in this course? That is, d id you participate actively in the sessions?

S3: I...my parents told me to join (this course).

R: No, did you participate actively in the sessions?

S3: Yes, I did.

R: How?

S3: When the teacher taught us a vocabulary (an action verb) and required us to act it out, I would raise my hand immediately.

R: Why? Why did you participate so actively?

S3: Because...um...if I could get marks, we could win. If we could get high marks, we could get the presents. And I could learn more vocabularies.

R: I understand. Did you like to attend the course?

S3: I liked.

R: You liked this course. Why?

S3: Because this course was very happy (I felt very happy attending the course).

R: Very happy. Did you ever feel unhappy (in this course)?

S3: No.

R: Was there any other reason?

S3: And, I have learned a lot of vocabulary, which I would not have the chance to learn them in normal lessons.

R: For example?

S3: For example…

R: Could you still remember?

S3: "Iron".

R: Any other?

S3: Um… "chase"?

R: Very good. If…ok, what did you like to do the most in the course?

S3: Play…play that game.

R: Which game?

S3: Horse-racing.

R: That is the game that you talked about before. The teacher would read you an action verb and you could walk a step further if you were holding that action verb card in your hands. Any other?

S3: Um…Noughts and crosses (過三關).

R: Noughts and crosses. In general, what did you like to do, apart from playing games?

S3: Um…spoke the words.

R: Spoke it, that simple. You loved this activity.

S3: Yes.

R: If there are courses in similar nature, will you attend it?

S3: I will.

R: Why?

S3: Because if I can attend once more, I can learn more vocabulary.

R: To learn more vocabulary. What are the vocabulary that you want to learn?

S3: Some vocabulary just like…playing 'hide and seek'.

R: Vocabulary! What are they about? For example, we learn verbs this time.

S3: Learn…nouns.

R: You want to learn the nouns. Okay.

Date: 18th March 2004
Length: 6 minutes
R: Researcher
S5: Subject 5

R: I would like to ask that before you attended the course, did you like to learn English?

S5: Quite liked.

R: Why?

S5: Because I think…um…sometimes, we will use English in daily lives

R: You could use English in daily lives, and you thought English was useful.

S5: Yes

R: So after attending the course, what did you think?

S5: *Um…

R: *What did you think of learning English?

S5: Um…not very difficult…um…also…learning English was very interesting

R: Very interesting…so, after attending the course, did you think learning English was easier? Was there any difference in comparison to before attending the course? Easier? More difficult? Or more or less the same?

S5: More or less the same. And, I have learned a lot of vocabularies.

R: So, I would like to ask, before you attend the course, did you like to learn English?

S5: Yes, I liked.

R: You liked it. So, after attending the course?

S5: I also liked to learn English.

R: You still liked. So, you liked it the same as before ? More or less the same as before? Liked it more? Or less liked than before?

S5: More than before.

R: So, I would like to ask, did you think there were good things about this course? Was there anything worth to be praised?

S5: Um…this course helped me learn a lot of "new English", um…might make me think that English was not really difficult.

R: "New English", for example? What do you mean by "new English"?

S5: New vocabulary.

R: Vocabulary. Any other? What is "new English"?

S5: That is, when they are new to me.

R: okay, apart from the above, during lesson, anything good?

S5: Um…that's all.

R: Could you tell me is there anything bad about this course?

S5: Um…bad things?

R: Yes, please try to think about it.

S5: I don't know.

R: For example, did you get along well with your classmates?

S5: Yes.

R: You got along well with them. Um…how about the teachers? What do you think about her in teaching the class?

S5: Um…the teacher treated us very well, the teacher taught us English.

R: So, did you participate actively in class?

S5: Yes.

R: You did. How?

S5: Um…that is…um…during class, when the teacher asked us to read aloud something, I would try my best to think back how to pronounce that English (word). Um…when playing games, I involved actively in the games.

R: Did you help other classmates?

S5: Yes

R: You helped them. Did you like to attend this course?

S5: Yes.

R: Why?

S5: I have learned a lot of vocabularies, I could get along with my classmates, um…that's all.

R: But these are normal in school classes too, you can learn vocabulary and get along with your classmates.

S5: Um…I felt happier when attending this course.

R: You felt happier. Why?

S5: Um…in normal school classes, there are not many activities, we will only follow the teacher and read some English (words), and that's all.

R: You'd like to have more activities. You'd like to move around.

S5: Yes.

R: Okay. What did you like to do the most during lessons?

S5: Liked…I liked…for example, playing games, following the teacher to speak and to act.

R: Follow the teacher to speak and act…what would you speak and act?

S5: Um…English vocabulary.

R: They were mainly verbs, right?

S5: Yes.

R: Okay, so, if there is course of similar nature, will you join it?

S5: I will.

R: Why?

S5: Um… because I can "increase myself" (增進自己) , also, I felt happy (in the last program), so I will join.

R: What is meant by "increase myself" (增進自己)?

S5: Um…to make myself learn more things.

R: To learn more things. So, what do you want to learn next time?

S5: Um…I want to learn the location of some vocabulary in a sentence.

R: I see. Something about grammar, to know more about verb, subject, object, those things. Okay, I understand. Let's take a look at the questionnaire that you have helped me to fill in. I do not really understand some of your answers. Here, it asks you what has hampered you from learning English, you have ticked a lot of choices, so, did these things appear during the course?

S5: No.

R: No? So, where did they appear?

S5: Um…sometimes, they appear in normal English school classes.

R: When attending normal English classes.

S5: Miss Kwok said that we should include the things that appeared in normal English school class (when filling in the questionnaire).

R: Here we have some misunderstandings. This is only to see the kinds of situations that you have faced during the course. So, when you were attending the course, were there any kinds of these situations?

S5: Um…no.

R: No. So let me correct the answers for you. So, you joined the course because of the teacher's encouragement, and you yourself wanted to join too. You were such a good girl.

S5: Yes.

R: Okay, thank you very much.

Picture Group
Date: 18th March 2004
Length: 6 minutes
R: Researcher
S2: Subject 2

R: Let me look at your questionnaire. Oh, you ticked all on the good side, did you?

S2: Ah.

R: I don't really understand one thing. In your questionnaire, you said you couldn't learn from a small group which was grouped by classmates. Did this phenomenon occur in the whole class?

S2: No. Sometimes when having lessons, we did not play much. Teachers were just like…

(Unidentifiable)

R: you could speak, and think it's interesting…How interesting it was?

S2: In the past, I didn't learn that before, now, I can learn them, I felt very (unidentifiable)

R: You did not learn that before, how?

S2: Because when I was in kindergarten, we seldom spoke English.

R: Oh, I see. That means you only started to speak English after you had entered primary school, so you liked it. So, after joining the course, did you like to learn English?

S2: I liked.

R: You liked it, you liked learning English more than before or less than before?

S2: more. It was because in the course I could play games and learnt English at the same time. I felt very happy. I think learning English in this way is really happy.

R: So it made you hoped that you could also learn English in this way in your school lessons, and you would have more fondness in learning English. Okay, so, before you attended the course, what did you think about English? *Difficult or easy?

S2: *A bit difficult.

R: It's difficult. Why was English difficult for you?

S2: Um…because I didn't know most of the vocabulary.

R: You didn't know most of the vocabulary, then, when teacher talked about the vocabulary that were unknown to you, you did not know what he/she was talking about. I understand. So, after attending the course, what did you think of learning English? Or in the course, what have you experienced about learning English?

S2: Um...I think learn English...I can learn more about knowledge of English, and when I grow up and seek for jobs, maybe (unidentifiable), sometimes, when people ask you about the way to go, they may be the foreigners, if I can answer them, I can help them and I will feel happy about that.

R: That is, you think English was useful. You didn't think English was so useful before, now, you think you can speak more English, and is useful. Okay, I understand. I would like to ask what were the good things about this course *that were worth to praise?

S2: *I could...I could learn English when playing games.

R: Any other?

S2: and, I could communicate with other classmates.

R: communicate with other classmates. In schooldays, did any of these happen in normal school classes?

S2: Yes.

R: Any other good things? No? Okay. Please speak honestly about the bad things of this course, so that we can have improvement.

S2: I think this course is a very good one.

R: No bad things? None? How about relationship with classmates? Happy? Were the teachers good? Everything was good. Really? No bad thing about the course? So, I want to ask you, did you participate actively in the in-class activities?

S2: Yes.

R: How? What did you do?

S2: When the teacher said we could have games, since most of us didn't have games (in the lessons), when having games, most of us would participate actively.

R: So, you participated actively in games. How about when teachers were teaching you? Were you active to learn?

S2: I was.

R: Did you like this course?

S2: I liked this course

R: Why?

S2: Because in the course, I could learn English and play games at the same time. When attending school lessons, the teacher always scolds us, and, my classmates are very noisy, we are unable to hear what the teacher is talking about.

R: So, in the course, the classmates were nicer, participating actively, the teachers were not so rude, right?

S2: um

R: Does it relate to the less number of classmates?

S2: I don't know, but there should have been less naughty classmates.

R: So, because all the classmates liked the course, you all could learn better in English. So, in schooldays, teachers always scold the students, so what do you think of the teacher in the course?

S2: Very good, and did not scold us.

R: Really? Did you have lessons with these kinds of teachers in school classes?

S2: Yes, I have attended lessons by Mr. Hui, that is the teacher that taught me in the course.

R: Does Mr. Hui scold your classmates in school lessons?

S2: In school lessons, sometimes, he scolds those who are naughty.

R: So it influences those who are well behaved, doesn't it? Okay, I understand. So, what did you like to do in lessons?

S2: Playing games in lessons, answering questions.

R: Playing games in lessons, answering questions. What were the advantages of them?

S2: Playing games could...when a word (an action verb) was given and we were asked to find the corresponding picture, it tested us whether we could remember the meaning of that English word (action verb).

R: Did you like the competitions?

S2: I liked competitions.

R: You liked to compete with another group or just because you wanted to win the game? That is, you want to win as a group or for yourself.

S2: A group, because we could divide the awards together.

R: What awards did you have?

S2: Some sweets, there were many kinds of things. Mr. Hui brought us a lot of presents.

R: Yes, I could see that too. So, the last question, will you join similar course again?

S2: Yes, I will.

R: Why?

S2: Because I can learn English and play games, which is better than listening to the noise of classmates in school lessons.

R: So, you would like to learn the same kind of verb, or new vocabulary?

S2: new ones.

R: For example?

S2: Um… (unidentifiable)

R: What?

S2: that is, those (unidentifiable)
R: So, what is it in English?

S2: Um…

R: Monitor. Any other? What is it about? Will it be relating to some kinds of vocabulary?

S2: Some vocabulary about the nature.

R: Oh, you like the nature, animals? Plants? Everything about the nature?

S2: Yes.

R: Okay, that's all. Thank you.

Date: 18th March 2004
Length: 10 minutes
R: Researcher
S4: Subject 4

R: Before you attended the course, did you like to learn English?

S4: I liked (to learn English).

R: You liked (to learn English). How? What did you like about it?

S4: They were easy to spell

R: You thought they were easy. After attending the course, did you like to learn English?

S4: I liked.

R: You liked (to learn English). You liked to learn English more, or more or less as before, or less than before?

S4: The same as before

R: The same as before. Before attending the course, what did you think about learning English?

S4: Very easy.

R: Very easy. Did you often get high marks at school?

S4: Yes.

R: You got high marks in English dictations?

S4: Yes.

R: Did you like to speak English?

S4: Spoke…I liked it.

R: Listening…did you like to listen to English?

S4: I liked it too.

R: Wow, that's really great. After attending the course, what did you think of learning English?

S4: Learn English…

R: That is, now, after attending the course, how did you feel about learning English?

S4: As easier as before (when learning English).

R: Why?

S4: Because I played games and spelled the words at the same time.

R: okay. So, when you learn English by yourself, there are not many games, so…

S4: I will spell the words by myself

R: Spell the words by *yourself

S4: *I read the words slowly, then, I know how to spell them.
R: Will you create any games for yourself in order to help you spell the words?

S4: Yes, I will.

R: You will do so, *how?

S4: *I will play with my friends.

R: How? Could you give me an example?

S4: Just like, we will take a look at a word first, then, a person has to act it out, then we have to spell the word out and speak it out (unidentifiable)

R: Oh, I see. That is, you learned from the games in our course, when you learn any new vocabulary, you will play this game. That's really great. So, what are the good things about this course?

S4: I can learn a lot of English.

R: Any other?

S4: Difficult words became easy.

R: Okay. Were there any bad things about the course?

S4: No.

R: Did you participate actively in the course?

S4: Yes, I did.

R: You did, why?

S4: Because if you participated in it, you could learn a lot of things.

R: That is, if you keep silence and did not participate actively, you will waste the chance (to learn English)? So…did you like this course?

S4: I like the course.

R: Why?

S4: Because I liked English. Once I heard it was an English course, I wanted to participate in it.

R: Really? Why did you like English so much?

S4: Because English teachers treated us very nicely, he always played games with us.

R: I see. So, what did you like to do the most in this course?

S4: Um…when competing together.

R: Compete…any other? How to compete?

S4: For example, when teacher came out and stuck a lot of paper on the board, then, you had to write (the word) down on those paper.

R: To write down on what kind of paper?

S4: Those…the paper given by the teachers were printed with an "A" and a "B".

R: You especially liked this game or you liked other games too?

S4: I liked all of them.

R: That is, you liked all the competitions? That is, you liked the games whenever there were two groups competing for the winning position, why?

S4: Because when competing with each other, it could show that who would be the winner, and who would be the loser. The loser and the winner could learn from each other.

R: Um…so do you like to have competitions in normal school class? If the class is separated into two groups. Ok, I understand. Any other? Any other thing that you liked to do?

S4: I liked to discuss with classmates.

R: What kind of things did you like to discuss?

S4: To discuss how to win, and…to discuss…how to spell the words.

R: That is, when you were discussing about the answer, right? I understand. Any other? No? If you are given the chance, will you participate in a course with similar nature?

S4: I will.

R: You will, why?

S4: Because if the course is same as this one, I will attend the course, because I may achieve better academic results.

R: So, what do you think about your academic result now? Do you have any improvement?

S4: Um…every time, I will improve zero point something, or few marks.

R: That is, every time after you have attended English courses, you will have improvement? So, if you attend our course next time, what would you like to learn?

S4: I want to learn…

R: About?

S4: I want to learn…if I am now a primary 4 student, I would like to learn something that is for primary 5 students.

R: You are now going to be a primary 5 student, right? That is, to learn the knowledge which is a bit higher than your present level.

S4: So that when I grow up, I will have less pressure.

R: You want to learn them beforehand. Okay. Do you have any comment? That is, after attending the course. What did you think about it?

S4: Quite good.

R: Will you recommend the course to your friends?

S4: I will, but I am not sure whether the course will continue to be held or not.

R: Okay, thank you.

Combined Group
Date: 18th March 2004
Length: 8 minutes
R: Researcher
S1: Subject 1

R: First, I would like to ask you that before you attended the course, did you like to learn English?

S1: [Speaking softly] I liked to learn English.

R: You liked to learn English. In learning English, what kind of things did you like to learn?

S1: Learn English, for example…games

R: Before attending the course, which was on Saturday, right? [Emphasizing] Before attending the course, did you like to learn English?

S1: I liked (to learn English)

R: What kind of things in English did you like to learn?

S1: How to spell the English words and how to take the dictation.

R: You liked (English). After attending the course, did you still like to learn English?

S1: I liked.

R: Still like to learn English. Did you think you liked more in learning English or less?

S1: [Speak louder] I like (learning English) more. It is because the marks for dictation are much better now.

R: Why?

S1: It was because before (attending the course), the marks of my dictation were not very good. After attending the 1st lesson, the marks of my dictation were much better. My marks have improved continuously.

R: [Very impressed] You have improved continuously! So, what are your dictation marks now?

S1: Today I received the English dictation, which were 100 marks.

R: [In a praising tone] Wow! You are so clever. Why? Why have your dictation marks become better?

S1: Because, I have paid a lot of effort to learn when attending the course. I paid attention, (unintelligible), I asked teacher how to speak and spell the English (word).

R: So, you learned some vocabulary from that

S1: * Um.

R: * and applied them into the dictation.

S1: Um.

R: You are very good. I would like to ask, before attending our course, what did you think of learning English? Did you think it is difficult?

S1: No.

R: What did you think of it?

S1: Learning English is… was not very difficult, not very easy.

R: Just in the middle?

S1: Um. (Agree)

R: So, after attending the course, what did you think of learning English?

S1: Some words were difficult, some words were easy.

R: It's the same, similar (to the thinking before attending the course).

S1: Some words, I know how to spell, how to speak, but I don't know how to write them.

R: Um, okay. So, I have read a questionnaire that was done by you, you said that you were still not really willing to speak English with others?

S1: Yes.

R: Why? Even after attending the course, you were still not very willing to speak English with others.

S1: Before attending the course, I didn't really like to speak English with others.

R: Um, so how about now?

S1: I spoke much more (in English with others).

R: You spoke much more. Okay. So, I would like to ask, what were the good things about this course?

S1: Um…I could learn a lot of useful and helpful English.

R: A-hah.

S1: Could use a lot of different ways to learn (English).

R: A lot of ways, for example?

S1: Looked, and spoke.

R: What to look at?

S1: Pictures.

R: Looked at pictures to learn.

S1: Listened to what the teacher has said.

R: Listened to the teacher speaking (the word).

S1: Did some actions.

R: Did some actions also.

S1: Could also speak (by himself).

R: Didn't you do these in school classes?

S1: We do that. But the teacher seldom lets us to look (at pictures) and listens (to how to speak the word). In a lot of times, the teacher only lets us to use the mouth to speak or spell.

R: I understand. So, tell me about the bad things for this course?

S1: Nothing.

R: Really? Think about it?

S1: I can't think of any.

R: Really? For example, you got along with your classmates happily, the teachers were very good, everything was good?

S1: Yes.

R: Okay. So, when you were attending the course, wee you enthusiastic? Did you participate actively?

S1: Yes.

R: How?

S1: Because I attended another course before, what's the name? Um…in which we were told that we had to participate in learning actively, we had to appreciate others and ourselves, so I participated actively in learning and getting along with others.

R: Okay, I understand. Did you like to attend this course?

S1: I liked to.

R: Why?

S1: Because it helped me to grow intelligently, and I could learn a lot of English.

R: What's meant by growing intelligently?

S1: That is, we can use the intelligence when we are abroad, when we have become an adult.

R: You can use your intelligence in future. I understand. So, what were your favorite activities?

S1: Um…play games.

R: Play games. Any other?

S1: Yes

R: For example?

S1: Won the game.

R: About games again. That means having to compete with others.

S1: And when speaking English.

R: When speaking English?

S1: Because when speaking English, teachers asked us to do some actions. For example, like squat, I like speaking English the most.

R: What actions did you like to do?

S1: Most of the actions.

R: (the subject did the action) Ah, chase. So, what was "kneel" (the researcher spoke in Cantonese). Do you remember?

S1: I forget.

R: "kneel", right? How about "crawl" (the researcher spoke in Cantonese)? Any other actions (that you liked to do)?

S1: No.

R: No? How about "squat" (the researcher spoke in Cantonese)? Did you like it?

S1: "cat".

R: "Squat".

S1: Cat.

R: Squat here.

S1: Ah, I though you said "cat".

R: Will you join another similar activity? (Unintelligible)

R: Why did you join the course?

S1: Because I wanted to go travel, to the lakeside. When I get lost, I can ask people for help.

R: That is, you will be able to speak English with others.

S1: Yes. When I am there, I can ask people what are the harms that can bring by that insect.

R: You like animals very much, right?

S1 Yes. I have the sane passion for plants too.

R: Really? You can be a scientist in the future. Okay, thank you very much.

Date: 18th March 2004
Length: 9 minutes
R: Researcher
S6: Subject 6

R: Let me take a look at your questionnaire. First, I would like to ask, before you attended the course, did you like to learn English?

S6: I liked.

R: You liked it. How?

S6: Um…I was anxious to learn (English).

R: So, after attending the course, did you still like to learn English?

S6: Yes.

R: You still liked. Did you like it more? More or less the same? Or less?

S6: More.

R: More. Why? What's your feeling about it?

S6: Because it's interesting.

R: Because it's interesting, so you like more about learning English than before. So, before you attend the course, what do you think of English?

S6: Um…I can learn more

R: What did you think of English? That is, difficult? Easy? Nothing special?

S6: There's nothing special about English.

R: That is, it similar to other subjects? You were able to learn it, it's not really difficult?

S6: Ah.

R: So, after attending the course, what did you think of English?

S6: Easier, a little bit.

R: Easier, a little bit. Why?

S6: Because I learned new things.
R: How did the new things help you?

S6: I learned more things.

R: Learned more things, that is, you understood more (things). What did you think about the good things about this course?

S6: I played and learnt.

R: You could play and learn. Any other? Anything special? Other things? Anything good about this course. It could be related to the teachers, the classmates. It could also be related to the activities (in class) too.

S6: The games were interesting.

R: How about the teachers?

S6: The teacher was very good.

R: [Happy] The teacher was very good, everything was good. How about the classmates?

S6: Not very good.

R: Classmates were not very good, why?

S6: Sometimes, during lessons, we would quarrel.

R: Why?

S6: For getting marks

R: For getting marks. That is, when having competitions, sometimes, there were quarrels between classmates.

S6: Ah (Yes).

R: So, at last, how did you solve this problem?

S6: The teacher punished us.
R: The teacher employed punishment. Did the teacher punish you?

S6: No.

R: Okay. Did you participate actively in the course?

S6: Quite.

R: Why? Why not participated more actively? Was there anything that encouraged you to participate actively. Or was there anything that hampered you from (participating actively)?

S6: Some vocabulary was unknown to me.

R: You didn't know some of the vocabulary, so, sometimes, you couldn't participate actively, could you?

S6: Ah (Yes).

R: okay, I understand. There were difficult words. So, did you like to attend this course?

S6: I liked to.

R: Why?

S6: There were a lot of things to learn and to play.

R: There were a lot of things to learn and to play. Apart from that? What did you mean by "there were a lot of things to learn"? We only studied verbs in the course.

S6: It(The program) taught you how to pronounce the word.

R: That is, you liked to listen to the teacher pronouncing the words. How about playing? Did you play all the time? Every lesson?

S6: Yes.

R: What did you like to do the most in lessons?

S6: Playing.

R: You liked to play the most. It's kind of brief. You liked to play. How to play?

S6: Um…

R: That is, playing games? You mean playing games individually? Or competing with your own group?

S6: Um…competition.

R: You liked to compete with others. So, if there is a chance, will you join a course of similar nature?

S6: Yes, I will.

R: You will. Why?

S6: Because there are things for me to learn.

R: Okay. Do you want to learn similar knowledge or new things?

S6: New things.

R: For example? What are the new things?

S6: Sentences.

R: You want to learn a complete sentence. What do you mean by "sentence"? How to teach "sentence"?

S6: How to memorize sentences.

R: So you will have to memorize a lot of things.

S6: To spell words that are difficult.

R: TI forgot to ask you just now. You thought there were good things about this course, was there anything bad?

S6: Yes.

R: For example?

S6: People were always noisy.

R: [louder] Very noisy. Classmates?

S6: They were quarreling.

R: Quarrel. Which group were you in?

S6: Group 3.

R: There were quarrels. Any other?

S6: No.

R: That is, the teacher was very good. Did she scold all of you if you students were quarreling?

S6: Sometimes.

R: The teacher would sometimes employ punishment, right? Okay. I wanted to take a look at here (the questionnaire). You said that you had no chance to speak English. Did it happen in the course?

S6: Sometimes, I didn't have the chance to speak.

R: That is, this kind of situation happened in the course too. Okay, I understand. Why didn't you have to chance to talk?

S6: Um…

R: In what situation you had no chance to talk?

S6: When playing.

R: When playing. What do you mean you couldn't speak English? I don't understand. That is, you had to wait for longer time?

S6: Um…

R: Think about it, how?

S6: Um… when being punished

R: When you were being punished, you couldn't speak. Okay, I understand. Thank you very much.

APPENDIX O1. BEAP 2004 Timetable of the Action Group

Session 1	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 31 Simon Says
1:45p.m. - 2:15p.m.	# 13 My Birthday Party
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 38 Noughts and Crosses
3:15p.m. - 3:45p.m.	# 45 Fun with Action Verbs
3:45p.m. - 4:00p.m.	Classroom administration
Session 2	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 5 Helping a Martian
1:45p.m. - 2:15p.m.	# 6 Teaching a Martian
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 24 Decode the Secret Messages!
3:15p.m. - 3:45p.m.	# 27 What is it?
3:45p.m. - 4:00p.m.	Classroom administration
Session 3	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 48 Fun Matching
1:45p.m. - 2:15p.m.	# 19 My Timetable
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 33 Ring and Act
3:15p.m. - 3:45p.m.	# 34 Actionary
3:45p.m. - 4:00p.m.	Classroom administration
Session 4	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 41 Let's Dance!
1:45p.m. - 2:15p.m.	# 1 Buddy and Cassy
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 43 The Hammer Game
3:15p.m. - 3:45p.m.	# 37 Obstacle Race
3:45p.m. - 4:00p.m.	Classroom administration
Session 5	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 2 In the Park
1:45p.m. - 2:15p.m.	# 3 My Dog & I
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 39 Neighbors
3:15p.m. - 3:45p.m.	# 36 Pass the Hat! Pass the Bag!
3:45p.m. - 4:00p.m.	Classroom administration
Session 6	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 01 Let's Cook
1:45p.m. - 2:15p.m.	# 02 Do What I Say
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 03 Simon Says II
3:15p.m. - 3:45p.m.	# 04 Noughts and Crosses II
3:45p.m. - 4:00p.m.	Classroom administration
Session 7	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 05 Parent and Children
1:45p.m. - 2:15p.m.	# 06 Pass the Hat! Pass the Bag II
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 07 Horse Race
3:15p.m. - 3:45p.m.	# 08 Right or Wrong

3:45p.m. - 4:00p.m.	Classroom administration
Session 8	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 29 Twister
1:45p.m. - 2:15p.m.	# 44 Guesstures
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 35 Pass the Message
3:15p.m. - 3:45p.m.	# 57 Slam the Dummies
3:45p.m. - 4:00p.m.	Classroom administration
10:00a.m. - 10:30a.m.	Post-test

APPENDIX O2. BEAP 2004 Timetable of the Picture Group

Session 1	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 16 Body Movements
1:45p.m. - 2:15p.m.	# 14 My Birthday Party
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 20 Noughts and Crosses
3:15p.m. - 3:45p.m.	# 3 Fun with Action Verbs
3:45p.m. - 4:00p.m.	Classroom administration
Session 2	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 6 Helping a Martian
1:45p.m. - 2:15p.m.	# 19 Teaching a Martian
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 21 Decode the Secret Message
3:15p.m. - 3:45p.m.	# 11 Cut and Paste
3:45p.m. - 4:00p.m.	Classroom administration
Session 3	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 2 Fun Matching
1:45p.m. - 2:15p.m.	# 15 My Timetable
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 22 Ring the Word
3:15p.m. - 3:45p.m.	# 10 Pictionary
3:45p.m. - 4:00p.m.	Classroom administration
Session 4	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 17 Dance steps
1:45p.m. - 2:15p.m.	# 7 Animal World
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 23 Get the Right Picture
3:15p.m. - 3:45p.m.	# 24 In the Playground
3:45p.m. - 4:00p.m.	Classroom administration
Session 5	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 4 In the Park
1:45p.m. - 2:15p.m.	# 5 My Dog & I
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 1 Spot the Differences
3:15p.m. - 3:45p.m.	# 9 Pass the Hat! Pass the Bag!
3:45p.m. - 4:00p.m.	Classroom administration
Session 6	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 001 Cooking Steps
1:45p.m. - 2:15p.m.	# 002 Do What I Say
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 003 Perfect Match
3:15p.m. - 3:45p.m.	# 004 Noughts and Crosses II
3:45p.m. - 4:00p.m.	Classroom administration
Session 7	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 005 Parent and Children
1:45p.m. - 2:15p.m.	# 006 Pass the Hat! Pass the Bag II
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 007 Right or Wrong
3:15p.m. - 3:45p.m.	# 008 Horse Race

3:45p.m. - 4:00p.m.	Classroom administration
Session 8	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 18 Quiztime
1:45p.m. - 2:15p.m.	# 12 Guesstures
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 8 Pass the Message
3:15p.m. - 3:45p.m.	# 13 Shout it out
3:45p.m. - 4:00p.m.	Classroom administration
10:00a.m. - 10:30a.m.	Post-test

APPENDIX O3. BEAP 2004 Timetable of the Combined Group

Session 1	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	#1 Look and Move
1:45p.m. - 2:15p.m.	#2 My Birthday Party
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	#3 Noughts and Crosses
3:15p.m. - 3:45p.m.	#4 Fun with Action Verbs
3:45p.m. - 4:00p.m.	Classroom administration
Session 2	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 5 Helping a Martian
1:45p.m. - 2:15p.m.	# 6 Teaching a Martian
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 7 Decode the Secret Messages!
3:15p.m. - 3:45p.m.	# 8 What is it?
3:45p.m. - 4:00p.m.	Classroom administration
Session 3	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 9 Fun Matching
1:45p.m. - 2:15p.m.	# 10 My Timetable
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 11 Ring and Act
3:15p.m. - 3:45p.m.	# 12 Pactionary
3:45p.m. - 4:00p.m.	Classroom administration
Session 4	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 13 Let's Dance!
1:45p.m. - 2:15p.m.	# 14 Buddy and Cassy
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 15 The Hammer Game
3:15p.m. - 3:45p.m.	# 16 Obstacle Race
3:45p.m. - 4:00p.m.	Classroom administration
Session 5	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 17 In the Park
1:45p.m. - 2:15p.m.	# 18 My Dog & I
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 19 Neighbors
3:15p.m. - 3:45p.m.	# 20 Pass the Hat! Pass the Bag!
3:45p.m. - 4:00p.m.	Classroom administration
Session 6	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 21 Let's Cook
1:45p.m. - 2:15p.m.	# 22 Do What I Say
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 23 Look and Move II
3:15p.m. - 3:45p.m.	# 24 Noughts and Crosses
3:45p.m. - 4:00p.m.	Classroom administration
Session 7	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 25 Parent and Children
1:45p.m. - 2:15p.m.	# 26 Pass the Hat! Pass the Bag! II
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 27 Right or Wrong
3:15p.m. - 3:45p.m.	# 28 Horse Race

3:45p.m. - 4:00p.m.	Classroom administration
Session 8	
1:00p.m. - 1:15p.m.	Classroom administration
1:15p.m. - 1:45p.m.	# 29 Twister
1:45p.m. - 2:15p.m.	# 30 Guesstures
2:15p.m. - 2:45p.m.	Break
2:45p.m. - 3:15p.m.	# 31 Pass the Message
3:15p.m. - 3:45p.m.	# 32 Slam the Dummies
3:45p.m. - 4:00p.m.	Classroom administration
10:00a.m. - 10:30a.m.	Post-test

APPENDIX P1. Test Results of the Second Study

Table 1. Independent-samples T-test on Total Pre-test Mean Scores for the Action Group and the Picture Group

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
pre_sum	Group 1	9	18.8889	3.58624	1.19541
	Group 2	10	19.5000	3.24037	1.02470

Note. Group 1 represents the Action Group; group 2 represents the Picture Group

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
pre_sum	Equal variances assumed	-.390	17	.701	-.6111	1.56564	-3.91433	2.69210
	Equal variances not assumed	-.388	16.268	.703	-.6111	1.57449	-3.94441	2.72219

Note. Levene's test for equality of variance is not shown in the chart

Table 2. Independent-samples T-test on Total Pre-test Mean Scores for the Picture Group and the Combined Group

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
pre_sum	Group 2	10	19.5000	3.24037	1.02470
	Group 3	10	18.9000	3.69534	1.16857

Note. Group 2 represents the Picture Group; group 3 represents the Combined Group

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
pre_sum	Equal variances assumed	.386	18	.704	.6000	1.55421	-2.66527	3.86527
	Equal variances not assumed	.386	17.698	.704	.6000	1.55421	-2.66926	3.86926

Note. Levene's test for equality of variance is not shown in the chart

Table 3. Independent-samples T-test on Total Pre-test Mean Scores for the Action Group and the Combined Group

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
pre_sum	Group 1	9	18.8889	3.58624	1.19541
	Group 3	10	18.9000	3.69534	1.16857

Note. Group 1 represents the Action Group; group 3 represents the Combined Group

		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
pre_sum	Equal variances assumed	-.007	17	.995	-.0111	1.67449	-3.54397	3.52175
	Equal variances not assumed	-.007	16.887	.995	-.0111	1.67170	-3.53987	3.51765

Note. Levene's test for equality of variance is not shown in the chart

Table 4. Independent-samples T-test on Total Post-test Mean Scores for the Action Group and the Picture Group

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
post_sum	Group 1	9	32.3333	6.04152	2.01384
	Group 2	10	32.1000	4.25441	1.34536

Note. Group 1 represents the Action Group; group 2 represents the Picture Group

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
post_sum	Equal variances assumed	.098	17	.923	.2333	2.37678	-4.78123	5.24790
	Equal variances not assumed	.096	14.217	.925	.2333	2.42189	-4.95367	5.42034

Note. Levene's test for equality of variance is not shown in the chart

Table 5. Independent-samples T-test on Total Post-test Mean Scores for the Picture Group and the Combined Group

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
post_sum	Group 2	10	32.1000	4.25441	1.34536
	Group 3	10	33.9000	2.13177	.67412

Note. Group 2represents the Picture Group; group 3 represents the Combined Group

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
post_sum	Equal variances assumed	-1.196	18	.247	-1.8000	1.50481	-4.96148	1.36148
	Equal variances not assumed	-1.196	13.251	.253	-1.8000	1.50481	-5.04468	1.44468

Note. Levene's test for equality of variance is not shown in the chart

Table 6. Independent-samples T-test on Total Post-test Mean Scores for the Action Group and the Combined Group

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
post_sum	Group 1	9	32.3333	6.04152	2.01384
	Group 3	10	33.9000	2.13177	.67412

Note. Group 1 represents the Action Group; group 3 represents the Combined Group

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
post_sum	Equal variances assumed	-.771	17	.452	-1.5667	2.03324	-5.85642	2.72309
	Equal variances not assumed	-.738	9.784	.478	-1.5667	2.12368	-6.31270	3.17937

Note. Levene's test for equality of variance is not shown in the chart

Table 7. Paired-samples T-test on Pre- and Post-test Mean Scores for the Action Group

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre_sum	18.8889	9	3.58624	1.19541
	post_sum	32.3333	9	6.04152	2.01384

Note: pair 1 indicates the two variables of the Action Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pre_sum - post_sum	-13.4444	4.74634	1.58211	-17.0928	-9.7961	-8.498	8	.000

Table 8. Paired-samples T-test on Pre- and Post-test Mean Scores for the Picture Group

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre_sum	19.5000	10	3.24037	1.02470
	post_sum	32.1000	10	4.25441	1.34536

Note: pair 1 indicates the two variables of the Picture Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pre_sum - post_sum	-12.6000	2.95146	.93333	-14.7113	-10.4887	-13.500	9	.000

Table 9. Paired-samples T-test of Pre- and Post-test Mean Scores of Action Group

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre_sum	18.9000	10	3.69534	1.16857
	post_sum	33.9000	10	2.13177	.67412

Note: pair 1 indicates the two variables of Combined Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pre_sum - post_sum	-15.0000	3.49603	1.10554	-17.5009	-12.4991	-13.568	9	.000

APPENDIX P2. BEAPs 2004 Subjects' Questionnaire Results

Table 1. Means Scores of Questionnaire Items Concerning Subjects' Perceived English Abilities

GROUP		Volume of Speaking		Listening Ability	
		Before	After	Before	After
Action Group	Mean	2.67	2.33	2.33	2.22
	N	9	9	9	9
	Std. Deviation	.707	.707	.707	1.202
Picture Group	Mean	2.60	2.50	2.30	2.00
	N	10	10	10	10
	Std. Deviation	.699	.850	.675	.667
Combined Group	Mean	2.70	2.70	3.30	2.10
	N	10	10	10	10
	Std. Deviation	.483	1.160	.823	.994
Total	Mean	2.66	2.52	2.66	2.10
	N	29	29	29	29
	Std. Deviation	.614	.911	.857	.939

Table 2. Paired-samples T-test of Mean Scores of Subjects' Perceived English Abilities of Action Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Speaking-volume of voice - Speaking-volume of voice	.33	.707	.236	-.21	.88	1.414	8	.195
Pair 2	Listening ability - Listening ability	.11	1.054	.351	-.70	.92	.316	8	.760

Table 3. Paired-samples T-test on Mean Scores of Subjects' Perceived English Abilities for the Picture Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Speaking-volume of voice - Speaking-volume of voice	.10	.994	.314	-.61	.81	.318	9	.758
Pair 2	Listening ability - Listening ability	.30	1.160	.367	-.53	1.13	.818	9	.434

Table 4. Paired-samples T-test on Mean Scores of Subjects' Perceived English Abilities for the Combined Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Speaking-volume of voice - Speaking-volume of voice	.00	1.247	.394	-.89	.89	.000	9	1.000
Pair 2	Listening ability - Listening ability	1.20	1.229	.389	.32	2.08	3.087	9	.013

Table 5. Means Scores of Questionnaire Items Concerning Subjects' Attitudes towards English (Learning)

GROUP		Willingness of Speaking English		Fondness of English Learning		Confidence Level of Learning English		Active participation in English lesson	
		Before	After	Before	After	Before	After	Before	After
A.G.	Mean	2.44	2.44	1.78	1.78	2.22	2.11	2.22	2.33
	N	9	9	9	9	9	9	9	9
	Std. Deviation	1.130	.882	.667	.667	.667	.782	1.093	1.414
P.G.	Mean	2.30	2.20	1.90	1.90	2.30	2.30	2.70	1.70
	N	10	10	10	10	10	10	10	10
	Std. Deviation	1.252	.632	.994	.738	1.059	.823	1.059	1.059
C.G.	Mean	2.70	2.40	2.90	2.50	2.60	2.60	3.20	1.90
	N	10	10	10	10	10	10	10	10
	Std. Deviation	1.337	.843	1.449	1.269	.699	1.174	.632	.876
Total	Mean	2.48	2.34	2.21	2.07	2.38	2.34	2.72	1.97
	N	29	29	29	29	29	29	29	29
	Std. Deviation	1.214	.769	1.177	.961	.820	.936	.996	1.117

Table 6. Paired-samples T-test on Subjects' Attitudes towards English (Learning)'s Mean Scores for the Action Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	willingness to speak English - willingness to speak English	.00	1.732	.577	-1.33	1.33	.000	8	1.000
Pair 2	fondness of English - fondness of English	.00	1.000	.333	-.77	.77	.000	8	1.000
Pair 3	confidence level of learning English - confidence level of learning English	.11	.782	.261	-.49	.71	.426	8	.681
Pair 4	Active participation in English lesson - Active participation in English lesson	-.11	.928	.309	-.82	.60	-.359	8	.729

Table 7. Paired-samples T-test on Subjects' Attitudes towards English (Learning)'s Mean Scores for the Picture Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	willingness to speak English - willingness to speak English	.10	1.370	.433	-.88	1.08	.231	9	.823
Pair 2	fondness of English - fondness of English	.00	1.054	.333	-.75	.75	.000	9	1.000
Pair 3	confidence level of learning English - confidence level of learning English	.00	1.247	.394	-.89	.89	.000	9	1.000
Pair 4	Active participation in English lesson - Active participation in English lesson	1.00	1.155	.365	.17	1.83	2.739	9	.023

Table 8. Paired-samples T-test of Mean Scores on Subjects' Attitudes towards English (Learning) for the Combined Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	willingness to speak English - willingness to speak English	.30	.949	.300	-.38	.98	1.000	9	.343
Pair 2	fondness of English - fondness of English	.40	1.174	.371	-.44	1.24	1.078	9	.309
Pair 3	confidence level of learning English - confidence level of learning English	.00	1.247	.394	-.89	.89	.000	9	1.000
Pair 4	Active participation in English lesson - Active participation in English lesson	1.30	1.059	.335	.54	2.06	3.881	9	.004

Table 9. Means Scores of Questionnaire Items Concerning Subjects' Views on English before the BEAPs

GROUP		Interesting	Easy	Useful	Boring	Difficult	Useless
Action Group	Mean	.78	.44	.78	.00	.22	.00
	N	9	9	9	9	9	9
	Std. Deviation	.441	.527	.441	.000	.441	.000
Picture Group	Mean	.80	.30	.70	.10	.40	.00
	N	10	10	10	10	10	10
	Std. Deviation	.422	.483	.483	.316	.516	.000
Combined Group	Mean	.70	.00	.80	.10	.60	.10
	N	10	10	10	10	10	10
	Std. Deviation	.483	.000	.422	.316	.516	.316
Total	Mean	.76	.24	.76	.07	.41	.03
	N	29	29	29	29	29	29
	Std. Deviation	.435	.435	.435	.258	.501	.186

Table 10. Means Scores of Questionnaire Items Concerning Subjects' Views on English after the BEAPs

GROUP		Interesting	Easy	Useful	Boring	Difficult	Useless
Action Group	Mean	.89	.22	.67	.00	.11	.11
	N	9	9	9	9	9	9
	Std. Deviation	.333	.441	.500	.000	.333	.333
Picture Group	Mean	.90	.40	.50	.10	.10	.00
	N	10	10	10	10	10	10
	Std. Deviation	.316	.516	.527	.316	.316	.000
Combined Group	Mean	.90	.50	.70	.00	.00	.00
	N	10	10	10	10	10	10
	Std. Deviation	.316	.527	.483	.000	.000	.000
Total	Mean	.90	.38	.62	.03	.07	.03
	N	29	29	29	29	29	29
	Std. Deviation	.310	.494	.494	.186	.258	.186

Table 11. Paired-samples T-test on Pre- and Post-program Mean Scores of Subjects' Views on English for the Action Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Interesting - Interesting	-.11	.333	.111	-.37	.15	-1.000	8	.347
Pair 2	Easy - Easy	.22	.833	.278	-.42	.86	.800	8	.447
Pair 3	Useful - Useful	.11	.782	.261	-.49	.71	.426	8	.681
Pair 4	Boring - Boring	--	--	--	--	--	--	--	--
Pair 5	Difficult - Difficult	.11	.333	.111	-.15	.37	1.000	8	.347
Pair 6	Useless - Useless	-.11	.333	.111	-.37	.15	-1.000	8	.347

--: suggests that the correlation and t cannot be computed because the standard error of the difference is 0.

Table 12. Paired-samples T-test on Pre- and Post-program Mean Scores of Subjects' Views on English for the Picture Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Interesting - Interesting	-.10	.316	.100	-.33	.13	-1.000	9	.343
Pair 2	Easy - Easy	-.10	.568	.180	-.51	.31	-.557	9	.591
Pair 3	Useful - Useful	.20	.422	.133	-.10	.50	1.500	9	.168
Pair 4	Boring - Boring	.00	.471	.149	-.34	.34	.000	9	1.000
Pair 5	Difficult - Difficult	.30	.483	.153	-.05	.65	1.964	9	.081
Pair 6	Useless - Useless	--	--	--	--	--	--	--	--

--: suggests that the correlation and t cannot be computed because the standard error of the difference is 0.

Table 13. Paired-samples T-test on Pre- and Post-program Mean Scores of Subjects' Views on English for the Combined Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Interesting - Interesting	-.20	.632	.200	-.65	.25	-1.000	9	.343
Pair 2	Easy - Easy	-.50	.527	.167	-.88	-.12	-3.000	9	.015
Pair 3	Useful - Useful	.10	.568	.180	-.31	.51	.557	9	.591
Pair 4	Boring - Boring	.10	.316	.100	-.13	.33	1.000	9	.343
Pair 5	Difficult - Difficult	.60	.516	.163	.23	.97	3.674	9	.005
Pair 6	Useless - Useless	.10	.316	.100	-.13	.33	1.000	9	.343

Table 14. Means Scores of Questionnaire Items Concerning Subjects' Like when Learning English (Part 1)

GROUP		has many activities/ games		has interesting teaching content		can look at pictures/ real objects		can listen to others speaking English		can speak English	
		Before	After	Before	After	Before	After	Before	After	Before	After
A.G.	Mean	.78	.78	.33	.33	.44	.11	.22	.11	.44	.44
	N	9	9	9	9	9	9	9	9	9	9
	Std. Deviation	.441	.441	.500	.500	.527	.333	.441	.333	.527	.527
P.G.	Mean	1.00	.80	.60	.60	.40	.50	.10	.40	.50	.50
	N	10	10	10	10	10	10	10	10	10	10
	Std. Deviation	.000	.422	.516	.516	.516	.527	.316	.516	.527	.527
C.G.	Mean	.90	.70	.50	.50	.50	.50	.40	.40	.20	.30
	N	10	10	10	10	10	10	10	10	10	10
	Std. Deviation	.316	.483	.527	.527	.527	.527	.516	.516	.422	.483
Total	Mean	.90	.76	.48	.48	.45	.38	.24	.31	.38	.41
	N	29	29	29	29	29	29	29	29	29	29
	Std. Deviation	.310	.435	.509	.509	.506	.494	.435	.471	.494	.501

Table 15. Means Scores of Questionnaire Items Concerning Subjects' Like when Learning English (Part 2)

GROUP		can learn in small groups		has good teacher and TAs		has awards (e.g. candies and stickers)		Others	
		Before	After	Before	After	Before	After	Before	After
A.G.	Mean	.33	.78	.33	.11	.11	.00	.00	.00
	N	9	9	9	9	9	9	9	9
	Std. Deviation	.500	.441	.500	.333	.333	.000	.000	.000
P.G.	Mean	.40	.60	.10	.20	.70	.10	.10	.00
	N	10	10	10	10	10	10	10	10
	Std. Deviation	.516	.516	.316	.422	.483	.316	.316	.000
C.G.	Mean	.40	.90	.40	.40	.40	.50	.10	.20
	N	10	10	10	10	10	10	10	10
	Std. Deviation	.516	.316	.516	.516	.516	.527	.316	.632
Total	Mean	.38	.76	.28	.24	.41	.21	.07	.07
	N	29	29	29	29	29	29	29	29
	Std. Deviation	.494	.435	.455	.435	.501	.412	.258	.371

Table 16. Paired-samples T-test on Pre- and Post-program Mean Scores of the Subjects' Like when Learning English for the Action Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	has many activities/ games - has many activities/ games	.00	.500	.167	-.38	.38	.000	8	1.000
Pair 2	has interesting teaching content - has interesting teaching content	.00	.500	.167	-.38	.38	.000	8	1.000
Pair 3	can look at pictures/ real objects - can look at pictures/ real objects	.33	.500	.167	-.05	.72	2.000	8	.081
Pair 4	can listen to teacher/ other students speaking English - can listen to teacher/ other students speaking English	.11	.333	.111	-.15	.37	1.000	8	.347
Pair 5	can speak English - can speak English	.00	.500	.167	-.38	.38	.000	8	1.000
Pair 6	can learn in small groups - can learn in small groups	-.44	.527	.176	-.85	-.04	-2.530	8	.035
Pair 7	has good teacher and teaching assistants - has good teacher and teaching assistants	.22	.667	.222	-.29	.73	1.000	8	.347
Pair 8	has awards (e.g. candies and stickers) - has awards (e.g. candies and stickers)	.11	.333	.111	-.15	.37	1.000	8	.347
Pair 9	Others	--	--	--	--	--	--	--	--

Note. --: suggests that the correlation and t cannot be computed because the standard error of the difference is 0.

Table 17. Paired-samples T-test on Pre- and Post-program Mean Scores of the Subjects' Like when Learning English for the Picture Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	has many activities/ games - has many activities/ games	.20	.422	.133	-.10	.50	1.500	9	.168
Pair 2	has interesting teaching content - has interesting teaching content	.00	.816	.258	-.58	.58	.000	9	1.000
Pair 3	can look at pictures/ real objects - can look at pictures/ real objects	-.10	.876	.277	-.73	.53	-.361	9	.726
Pair 4	can listen to teacher/ other students speaking English - can listen to teacher/ other students speaking English	-.30	.483	.153	-.65	.05	-1.964	9	.081
Pair 5	can speak English - can speak English	.00	.816	.258	-.58	.58	.000	9	1.000
Pair 6	can learn in small groups - can learn in small groups	-.20	.632	.200	-.65	.25	-1.000	9	.343
Pair 7	has good teacher and teaching assistants - has good teacher and teaching assistants	-.10	.568	.180	-.51	.31	-.557	9	.591
Pair 8	has awards (e.g. candies and stickers) - has awards (e.g. candies and stickers)	.60	.516	.163	.23	.97	3.674	9	.005
Pair 9	Others	.10	.316	.100	-.13	.33	1.000	9	.343

Table 18. Paired-samples T-test on Pre- and Post-program Mean Scores of the Subjects' Like when Learning English for the Combined Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	has many activities/ games - has many activities/ games	.20	.422	.133	-.10	.50	1.500	9	.168
Pair 2	has interesting teaching content - has interesting teaching content	.00	.471	.149	-.34	.34	.000	9	1.000
Pair 3	can look at pictures/ real objects - can look at pictures/ real objects	.00	.667	.211	-.48	.48	.000	9	1.000
Pair 4	can listen to teacher/ other students speaking English - can listen to teacher/ other students speaking English	.00	.816	.258	-.58	.58	.000	9	1.000
Pair 5	can speak English - can speak English	-.10	.568	.180	-.51	.31	-.557	9	.591
Pair 6	can learn in small groups - can learn in small groups	-.50	.527	.167	-.88	-.12	-3.000	9	.015
Pair 7	has good teacher and teaching assistants - has good teacher and teaching assistants	.00	.471	.149	-.34	.34	.000	9	1.000
Pair 8	has awards (e.g. candies and stickers) - has awards (e.g. candies and stickers)	-.10	.568	.180	-.51	.31	-.557	9	.591
Pair 9	Others	-.10	.738	.233	-.63	.43	-.429	9	.678

Table 19. Means Scores of Questionnaire Items Concerning Subjects' Perceived Hindrances in Learning English (Part 1)

GROUP		in lack of activities/ games		has boring teaching content		in lack of teaching aids		no chance to teacher/ other students speaking English		no chance to speak English	
		Before	In	Before	In	Before	In	Before	In	Before	In
A.G.	Mean	.44	.25	.11	.00	.44	.13	.22	.00	.33	.00
	N	9	8	9	8	9	8	9	8	9	8
	Std. Deviation	.527	.463	.333	.000	.527	.354	.441	.000	.500	.000
P.G.	Mean	.50	.11	.40	.00	.10	.11	.00	.00	.10	.00
	N	10	9	10	9	10	9	10	9	10	9
	Std. Deviation	.527	.333	.516	.000	.316	.333	.000	.000	.316	.000
C.G.	Mean	.70	.33	.30	.11	.50	.22	.00	.11	.20	.11
	N	10	9	10	9	10	9	10	9	10	9
	Std. Deviation	.483	.500	.483	.333	.527	.441	.000	.333	.422	.333
Total	Mean	.55	.23	.28	.04	.34	.15	.07	.04	.21	.04
	N	29	26	29	26	29	26	29	26	29	26
	Std. Deviation	.506	.430	.455	.196	.484	.368	.258	.196	.412	.196

Note. Some data are missing.

Table 20. Means Scores of Questionnaire Items Concerning Subjects' Perceived Hindrances in Learning English (Part 2)

GROUP		no chance to learn in small groups		teacher and teaching assistants		in lack of awards (e.g. candies and stickers)		Others	
		Before	In	Before	In	Before	In	Before	In
A.G.	Mean	.22	.13	.00	.00	.11	.13	.00	1.13
	N	9	8	9	8	9	8	9	8
	Std. Deviation	.441	.354	.000	.000	.333	.354	.000	.991
P.G.	Mean	.30	.00	.10	.00	.50	.11	.00	1.56
	N	10	9	10	9	10	9	10	9
	Std. Deviation	.483	.000	.316	.000	.527	.333	.000	.882
C.G.	Mean	.40	.22	.10	.22	.60	.22	.20	1.44
	N	10	9	10	9	10	9	10	9
	Std. Deviation	.516	.441	.316	.441	.516	.441	.422	.882
Total	Mean	.31	.12	.07	.08	.41	.15	.07	1.38
	N	29	26	29	26	29	26	29	26
	Std. Deviation	.471	.326	.258	.272	.501	.368	.258	.898

Note. Some data are missing.

Table 21. Paired-samples T-test on Mean Scores of Subjects' Perceived Hindrances in learning English for the Action Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	in lack of activities/ games - in lack of activities/ games	.13	.641	.227	-.41	.66	.552	7	.598
Pair 2	has boring teaching content - has boring teaching content	.13	.354	.125	-.17	.42	1.000	7	.351
Pair 3	in lack of teaching aids - in lack of teaching aids	.25	.463	.164	-.14	.64	1.528	7	.170
Pair 4	no chance to teacher/ other students speaking English - no chance to listen to English	.25	.463	.164	-.14	.64	1.528	7	.170
Pair 5	no chance to speak English - no chance to speak English	.38	.518	.183	-.06	.81	2.049	7	.080
Pair 6	no chance to learn in small groups - no chance to learn in small groups	.13	.641	.227	-.41	.66	.552	7	.598
Pair 7	teacher and teaching assistants - teacher and teaching assistants	--	--	--	--	--	--	--	--
Pair 8	in lack of awards (e.g. candies and stickers) - in lack of awards (e.g. candies and stickers)	--	--	--	--	--	--	--	--
Pair 9	Others- others	-1.13	.991	.350	-1.95	-.30	-3.211	7	.015

Note
Some data are missing
--: suggests that the correlation and t cannot be computed because the standard error of the difference is 0.

Table 22. Paired-samples T-test on Mean Scores of Subjects' Perceived Hindrances in learning English for the Picture Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	in lack of activities/ games - in lack of activities/ games	.33	.500	.167	-.05	.72	2.000	8	.081
Pair 2	has boring teaching content - has boring teaching content	.33	.500	.167	-.05	.72	2.000	8	.081
Pair 3	in lack of teaching aids - in lack of teaching aids	-.11	.333	.111	-.37	.15	-1.000	8	.347
Pair 4	no chance to teacher/ other students speaking English - no chance to listen to English	--	--	--	--	--	--	--	--
Pair 5	no chance to speak English - no chance to speak English	.11	.333	.111	-.15	.37	1.000	8	.347
Pair 6	no chance to learn in small groups - no chance to learn in small groups	.33	.500	.167	-.05	.72	2.000	8	.081
Pair 7	teacher and teaching assistants - teacher and teaching assistants	.11	.333	.111	-.15	.37	1.000	8	.347
Pair 8	in lack of awards (e.g. candies and stickers) - in lack of awards (e.g. candies and stickers)	.33	.500	.167	-.05	.72	2.000	8	.081
Pair 9	Others- others	-1.56	.882	.294	-2.23	-.88	-5.292	8	.001

Note
Some data are missing
--: suggests that the correlation and t cannot be computed because the standard error of the difference is 0.

Table 23. Paired-samples T-test on Mean Scores of Subjects' Perceived Hindrances in learning English for the Combined Group

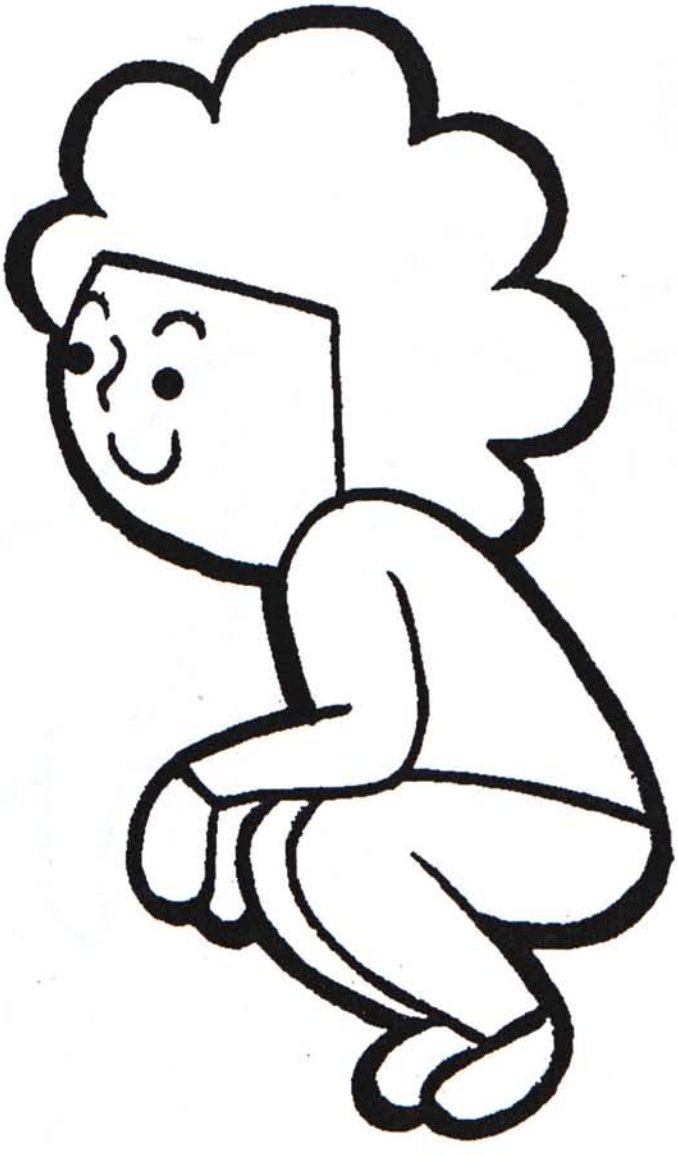
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	in lack of activities/ games - in lack of activities/ games	.33	.707	.236	-.21	.88	1.414	8	.195
Pair 2	has boring teaching content - has boring teaching content	.11	.333	.111	-.15	.37	1.000	8	.347
Pair 3	in lack of teaching aids - in lack of teaching aids	.22	.667	.222	-.29	.73	1.000	8	.347
Pair 4	no chance to teacher/ other students speaking English - no chance to listen to English	-.11	.333	.111	-.37	.15	-1.000	8	.347
Pair 5	no chance to speak English - no chance to speak English	.11	.333	.111	-.15	.37	1.000	8	.347
Pair 6	no chance to learn in small groups - no chance to learn in small groups	.11	.782	.261	-.49	.71	.426	8	.681
Pair 7	teacher and teaching assistants - teacher and teaching assistants	-.11	.601	.200	-.57	.35	-.555	8	.594
Pair 8	in lack of awards (e.g. candies and stickers) - in lack of awards (e.g. candies and stickers)	.33	.500	.167	-.05	.72	2.000	8	.081
Pair 9	Others- others	-1.33	.866	.289	-2.00	-.67	-4.619	8	.002

Note
Some data are missing

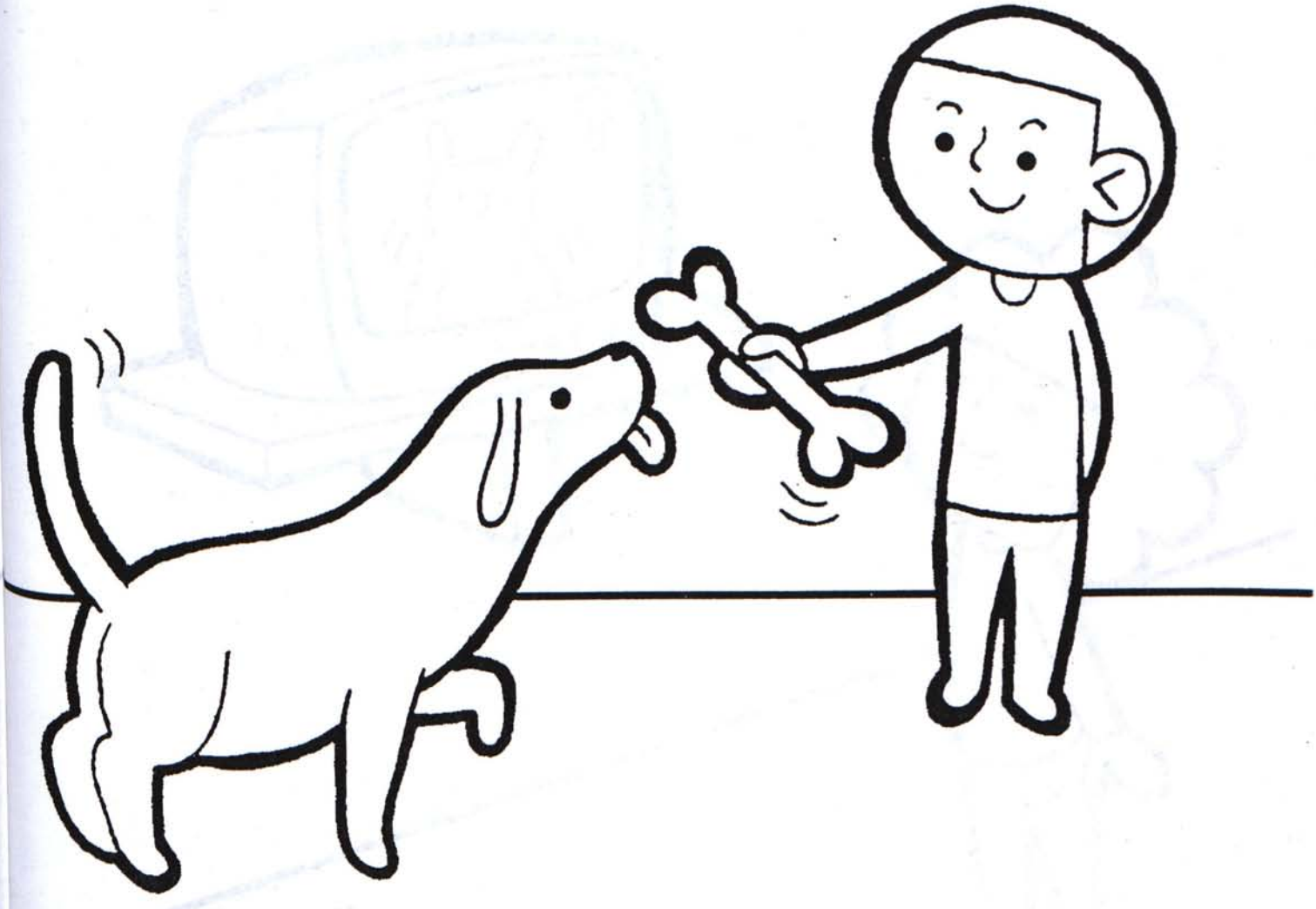
Table 24. Means scores of Questionnaire Items Concerning Subjects' Future Enrollment of the Program

GROUP		Future Enrollment of the BEAP (1:Yes; 2: No)
A.G.	Mean	1.11
	N	9
	Std. Deviation	.333
P.G.	Mean	1.10
	N	10
	Std. Deviation	316
C.G.	Mean	1.30
	N	10
	Std. Deviation	483
Total	Mean	1.17
	N	29
	Std. Deviation	.384

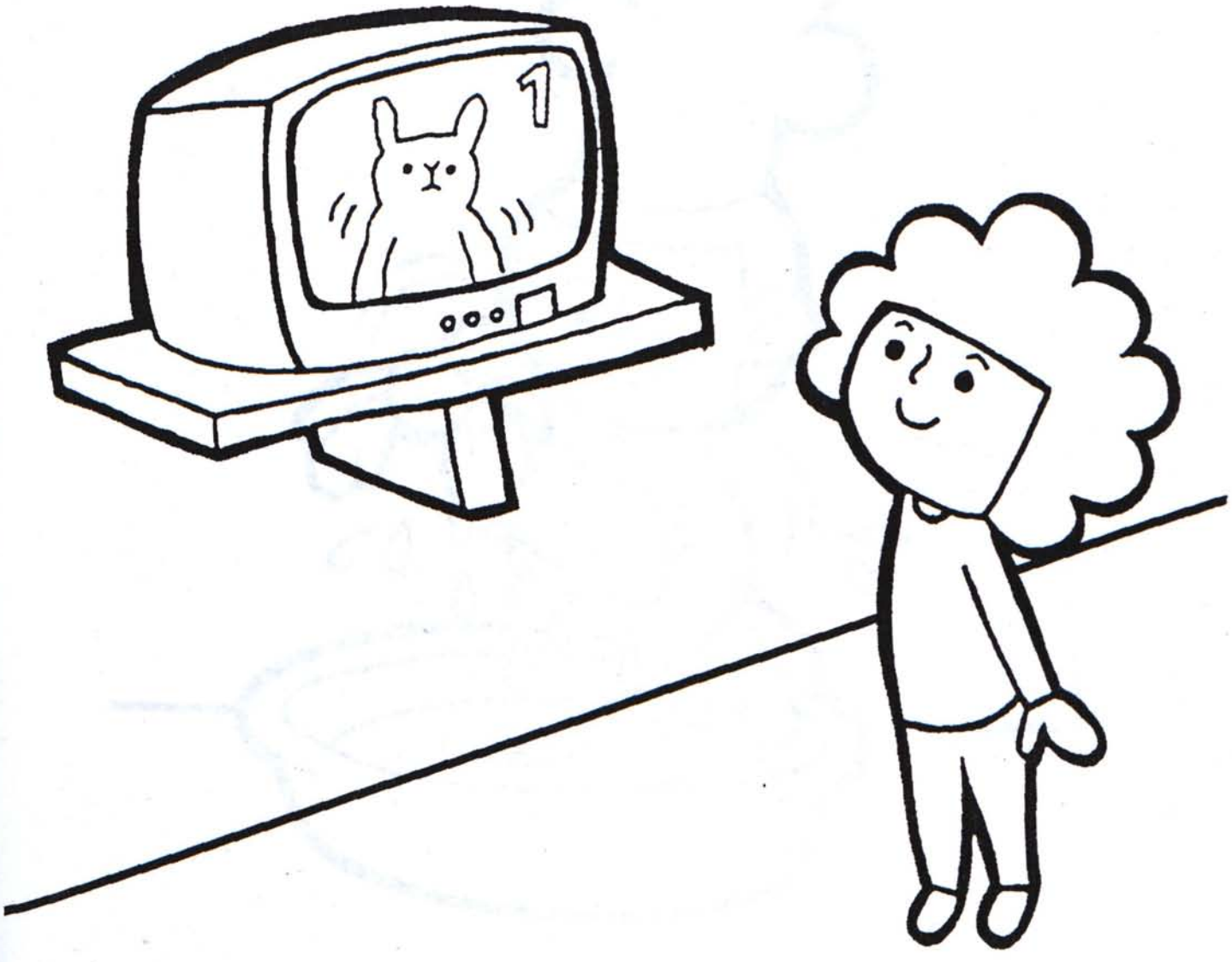
Appendix Q1. BEAPs Action Verb Picture Cards (Samples)



Note. The action is "squat".



Note. The action is "feed".



Note. The action is "watch".

Note. The action is "twist".

Appendix R1. "Cognition and Student Learning Research Grant Project" Announced by the Department of Education of the United States

Education Department Announces New Grants for Research in Student Learning

FOR RELEASE:
January 16, 2002

Contact: David Thomas
(202) 401-1576

As part of the Bush administration's goal to ensure that teaching methods used in America's classrooms have a solid scientific base, the U.S. Department of Education is requesting applications to conduct research on basic and higher order thinking skills and their links to improved student learning and higher academic achievement.

"One of our goals is to focus on what works to improve education," U.S. Secretary of Education Rod Paige said. "This program is another example of our efforts to produce quality research on teaching and learning and share it with educators and the public."

"We're looking for projects that will connect basic cognitive and brain sciences to schools and school settings," said Grover "Russ" Whitehurst, U.S. assistant secretary for the Office of Educational Research and Improvement. "There is a rich and vast base of knowledge and expertise in these sciences that we need to bring to bear on education. This new program will further that goal."

The notice for applications for the *2002 Cognition and Student Learning Research Grant Program* was published in the December 21, 2001 *Federal Register*.

Eligible applicants include public and private organizations, institutions of higher education, state and local educational agencies, and regional educational laboratories.

The department expects to make approximately 10 awards, ranging from $75,000 to $500,000 per year for each project. Projects will be funded for up to three years and up to $3 million is available for the first year of the program. Deadline for applications is April 15, 2002.

For further information on the request for applications for the *2002 Cognition and Student Learning Research Grant Program,* visit the Department of Education's Web site at http://www.ed.gov/legislation/FedRegister/announcements/2001-4/122101c.html PDF.

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Research on Learning and Education (ROLE)

Program Solicitation

NSF 02-023

DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES
DIVISION OF RESEARCH, EVALUATION AND COMMUNICATION

PRELIMINARY PROPOSAL DUE DATES(S) (*required*): March 15, 2002, September 1, 2002

FULL PROPOSAL DEADLINE(S): June 10, 2002, December 1, 2002

NATIONAL SCIENCE FOUNDATION

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Web Site at:

http://www.nsf.gov

II. PROGRAM DESCRIPTION

The ROLE Program helps advance progress toward the EHR goals through the development and application of new scientific knowledge. Goals for the ROLE Program are:

1. To discover and to describe neural, cognitive, affective, and conceptual learning processes required for life-long STEM learning;
2. To understand how prekindergarten through secondary teacher and post-secondary faculty content knowledge and pedagogy relate to the implementation that innovative and effective curricula, materials, and assessments require;
3. To develop research-based learning tools, pedagogical approaches, and materials that enhance STEM education at all levels;
4. To reevaluate the overall curriculum structure (including selection, ordering, and priorities of topics) to enhance STEM education at all levels;
5. To develop and to refine new education research and evaluation methods;
6. To increase the research capacity of the field, especially the development of new researchers and research-oriented education practitioners;
7. To collect and to analyze data and to use data to inform researchers, decision-makers and the general public;
8. To understand the factors that enhance the full participation of all Americans in the STEM enterprise and the approaches that can increase this participation; and
9. To increase the knowledge of learning, teaching and organizational models that lead to substantial and large-scale improvement in the efficiency, efficacy, and cost-effectiveness of the United States educational system.

ROLE: Areas of Concentration

A balanced portfolio to achieve these goals spans what may be viewed as a continuum framework. The purpose of the framework is to help enable the integration of research on learning into its broader educational and social context. The ROLE Program will support research across a four-quadrant science of learning continuum that includes:

1. Brain research as a foundation for research on human learning;
2. Fundamental research on behavioral, cognitive, affective and social aspects of human learning;
3. Research on STEM learning in formal and informal educational settings; and
4. Research on STEM learning in complex educational systems.

Each of these quadrants constitutes a broad research area, with its own distinct characteristics and historical foundations. The section "Sampling of Research Areas That May Be Considered in ROLE Proposals" illustrates some of the research areas that characterize the quadrants in this framework. In addition, the quadrants significantly overlap and inform one another. ROLE seeks gains at the intersections of these areas, where issues arising from research and educational practice can be reconciled, and hypotheses generated in one area may be tested and refined in others. The ROLE Program aims to advance the knowledge base in and across these multidisciplinary areas. EHR therefore expects that, as appropriate, NSF's other directorates may participate in the review of proposals to the ROLE Program.

I. Brain Research as a Foundation for Research on Learning

The effort to understand intelligence and learning, and their relationship to the human brain, is one of the most fundamental and profound journeys of basic science. Converging lines of research have begun to reveal how relatively simple forms of learning affect the brain's structure, activity, and organization, from infant development through adulthood. Cognitive processes . such as reading a word or analyzing a visual scene . are beginning to be understood in terms of neural systems. Discoveries of this nature are influencing our understanding of behavior and cognition. Neuroscience investigations at a wide range of spatial and temporal scales can contribute to fundamental understanding of the complex process of human learning

Appendix R3. Recommendation of the ministry of Education, Culture, Sports, Science and Technology of Japan

日本腦科學研究取重大進展

【15:50】 07/08/2002

【東方日報專訊】日本文部科學省提議把腦科學研究最新成果應用於幼兒教育、青少年學習、老年腦障礙恢復治療等。

日本的腦科學研究已經取得很大進展，可以通過超聲波裝置觀察大腦活動狀況，心理學和行爲科學研究也有不少突破。文部科學省認爲，把腦科學的成果應用於教育，對不斷增多的早期老人癡呆症患者和學習障礙者也會大有幫助。文部科學省明年決定啓動這項研究計畫，增加科研經費。

Appendix R4. Announcement of the Singapore Government

LexisNexis™ Academic

The Straits Times (Singapore)

January 27, 2002 Sunday

SECTION: SINGAPORE

LENGTH: 416 words

HEADLINE: NIE aims to be among world's best by 2010;
It will get $48m over five years for research to help it become a leader in the teaching of languages, maths and science

BYLINE: Chang Ai-lien

BODY:
THE National Institute of Education (NIE) wants to be a world leader in teacher training and educational research and it wants to do it within this decade.

So the Education Ministry is investing $48 million over the next five years to help the institute develop its research capabilities in literacy, the teaching of mathematics and science, and the use of information and commu- nications technology. The money will also go towards setting up a centre for research on teaching methods. NIE has the capacity to become an institute of education of world repute by 2010, both in terms of preparing teachers and educational research, said Education Minister Teo Chee Hean.

It is already well recognised and is probably one of the top institutes of its kind in Asia, with outstanding programmes in certain areas, he said last night when he opened its campus in Yunnan Garden, at the Nanyang Technological University.

But in research, there are many things that can be done better, he added. To maintain Singapore schools' position among the top in maths and science, the country must keep up with new develop- ments in education.

'The sciences are changing very quickly. Many interesting things are happening between biology, physics and chemistry,' he said.

In terms of literacy, he said, the home environment for the speaking of the mother tongue is changing rapidly, and advances are being made in understanding how the brain learns language.

It will be important to devise new and better methods to maintain the policy on bilingual education, said Rear-Admiral (NS) Teo.

Singapore is already a world leader in using information and communi- cations technology in the classroom, but more research could be done to see how this can be done better, he said.

'In many areas in education, we are very close to being at the forefront.

'There are things we can learn from other countries, but I think that, more and more, there are things which we have to think through for ourselves.

'Increasingly in the future, I hope that we will be able to share knowledge and share facilities with other countries and other top institutes of education in the world,' he said.

The institute's 16-ha campus, complete with a $400-million complex, boasts an impressive array of facilities, including 26 computer laboratories equipped with the latest systems and software; more than 50 teaching and research laboratories; a roof-top greenhouse, an art gallery and a theatre for performances.